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Neural Network Approximations in Numbers - entire version

George Anastassiou
Razvan Mezei

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Neural Network Approximations in Numbers

- Entire Version -

George A. Anastassiou, Razvan A. Mezei

Neural Network Approximations in Numbers

- Entire Version -

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This monograph is dedicated to our loved ones.

Preface

In this monograph, we present numerical applications of neural networks approximations, as they are presented for the first time in the recent monograph by the first author, titled "Parametrized, Deformed and General Neural networks" [1], Springer, Heidelberg, New York, 2023. That is confirming with numbers the theoretical results of the above mentioned monograph.

Next, we explain very briefly at simplest possible terms why this is of interest in the studies about neural networks approximation. Let h be a general sigmoid function with $h(0) = 0$, and $y = 1$ the horizontal asymptotes. Of course h is strictly increasing over $\mathbb{R}$. Let the parameter $0 < r < 1$ and $x > 0$. Then clearly $-x < x$ and $-x < -rx < rx < x$, furthermore it holds $h(-x) < h(-rx) < h(rx) < h(x)$. Consequently the sigmoid $y = h(rx)$ has a graph inside the graph of $y = h(x)$, of course with the same asymptotes $y = 1$. Therefore $h(rx)$ has derivatives (gradients) non-zero at more points x than $h(x)$ has different than zero or not as close to zero, thus killing a fewer number of neurons! And of course $h(rx)$ is more distant from $y = 1$, than $h(x)$ is. This is the main concern in choosing the proper activation function, which is a highly desired fact in Neural Networks theory. Also different activation functions allow for different non-linearities which might work better for solving a specific function. So the need to use neural networks with various activation functions is vivid. Thus, performing neural network approximations using different activation functions is not only necessary but fully justified.

Furthermore, the brain non-symmetry has been observed in animals and humans in terms of structure, function and behavior. This lateralization is thought to reflect evolutionary, hereditary, developmental, experiential and pathological factors. Consequently, it is natural to consider for our study deformed neural network activation functions and operators. Thus, this book is the appropriate study covering a great variety of applications and approaching reality as close as possible.

Our numerical applications cover the univariate case extensively in a great number of cases by employing SageMath [3], a free open-source mathematics software that uses a Python-based programming language. We also cover briefly the bivariate case by the use of C# programming language.

In each chapter in short we describe the neural network theory involved there.

The engaged activation functions we employ here are: θ-Deformed and λ-parametrized half hyperbolic tangent, q-Deformed and λ-parametrized A-generalized logistic function, and θ-Deformed and λ-parametrized hyperbolic tangent function.

The book's results are expected to find applications in the many areas of Applied Mathematics, Computer Science and Engineering, especially in Artificial Intelligence, Machine Learning and Deep Learning. Other possible applications can be in applied sciences like Statistics, Economics, etc. All in all what is presented here is a valuable tool for a large range of applications. Therefore this monograph is suitable for researchers, graduate students, practitioners and seminars of the above disciplines, also to be in all Science and Engineering libraries.

The preparation of this book took place during 2023-24 at the University of Memphis and Saint Martin's University.

January 1st, 2024.

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1 Introduction

This work is meant to be a companion to the published monograph of G.A. Anastassiou [Parametrized, Deformed and General Neural Networks, Springer, Heidelberg, New York, 2023], where the theoretical foundations for these results have already been established. In particular, in there, it was proven that the various operators presented below converge quantitatively to the identity operator.

In this current work would like to give our readers a sense of the error of approximation for various operators and particular values of n, parameter λ, deformation coefficient q, activation functions, density functions, neural network operators, and intervals applied for various functions. We estimate the error of approximation of the various neural network operators, and also compare the results to various monomial polynomial functions.

Please note the following:

- the code below was run using SageMath [3] version 9.5 and (towards the end of the book) C# version 10 (.NET 8).

- the estimates in this book are all subject to the error of appoximation inherent from using SageMath/C# as a tool and how floating point numbers are represented on computer systems. This error of approximation accummulates as we do more and more iterations.

- some tests are not complete - after running for a long time, a runtime error occured and some computations stalled.

- the reader is strongly advised to read and understand the code prior to reading the numerical results. The code is written in a simple way so it is understandable even for non computer scientists. The "left side" of our computations represents the error of approximation to the function by neural network operators. This error is compared to anticipated speeds of convergence and expressed by the "difference" values shown in every computational result.

2 Real-valued neural network approximation based on the q-deformed and λ-parametrized half hyperbolic tangent - introduction

We present in here some of the background and the main result that was proven in the monograph [Parametrized, Deformed and General Neural Networks, Springer, Heidelberg, New York, 2023], in Chapter 20.

The **activation function** [see monograph, formula 20.1] used for this part is defined as follows:

$$\varphi_q(t) := \frac{1 - qe^{-\beta t}}{1 + qe^{-\beta t}}, \forall\, t \in \mathbb{R}, where\ q,\ \beta > 0. \tag{1}$$

Then [see monograph, formula 20.8], we present the **density function**, the q-deformed and λ-

parametrized half hyperbolic tangent (which, in the SageMath code below was named theta(x) for consistency between all SageMath code presented in this current work):

$$\phi_q(x) := \frac{1}{4}(\varphi_q(x+1) - \varphi_q(x-1)) > 0, \forall x \in \mathbb{R},\ where\ q,\ \beta > 0. \tag{2}$$

Lastly, [see monograph, formula 20.27], we give the real-valued **linear neural network operators**:

$$H_n(f,x) := \frac{\sum_{k=\lceil na \rceil}^{\lfloor nb \rfloor} f(\frac{k}{n})\phi_q(nx-k)}{\sum_{k=\lceil na \rceil}^{\lfloor nb \rfloor} \phi_q(nx-k)},\ where\ f \in C([a,b]),\ x \in [a,b],\ q,\ \beta > 0. \tag{3}$$

It was shown [see monograph, Theorem 20.9], that:

$$\lim_{n\to\infty} H_n(f) = f, \tag{4}$$

pointwise and uniformly.

Next, we present our computational results using SageMath. Please note that we removed several of the results generated by the code below.

3 Real-valued neural network approximation based on the q-deformed and λ-parametrized half hyperbolic tangent - part 1

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
```

```
                print()
               ␣
↪print("-------------------------------------------------------------------------------")
                print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
               ␣
↪print("-------------------------------------------------------------------------------")
                #the activation function
                phi(x) = (1-q*(e^(-lamda*x)))/(1+q*(e^(-lamda*x)))   #formula 20.
↪1

                #q-deformed and β-parametrized half hyperbolic tangent
                theta(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 20.8

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [10, 20, 50, 100, 200, 500]:
                        #def H(n, f, x):    #real-valued linear neural network␣
↪operators
                        #    return sum(f(k/n)*theta(n*x-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(theta(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(H(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*theta(n*x0-k) for k in␣
↪[ceil(n*a),..,floor(n*b)])/sum(theta(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)]) - f(x0))
                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),
                              "\n                    1/n^("+str(power)+") =␣
↪"+str(val3),
                              "\n                    difference =␣
↪"+str(val3-val2))
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 6.14723251420852e-2
```

```
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.39714908485187e-1
n = 20 , left side = 1.11294566010310e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.95795965526594e-1
n = 50 , left side = 6.57022757028688e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.43547219008123e-1
n = 100 , left side = 3.61332770545404e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.15055366096418e-1
n = 200 , left side = 1.88501016814132e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.85178475655424e-1
n = 500 , left side = 7.72268598453840e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.47269212770295e-1
```

$\cos(x)$

```
n = 10 , left side = 5.17973276214348e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = -1.67860425870752e-2
n = 20 , left side = 2.51295039601676e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.55795491935229e-1
n = 50 , left side = 8.91716716056313e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.20077823105360e-1
n = 100 , left side = 4.20399787268633e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.09148664424095e-1
n = 200 , left side = 2.03292531654996e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.83699324171337e-1
n = 500 , left side = 7.95946134048608e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.47032437414348e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 2.25818738884073e-2
          1/n^(3/10) = 5.01187233627272e-1
```

```
          difference = 4.78605359738865e-1
n = 20 , left side = 4.04453908761683e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.66645140660736e-1
n = 50 , left side = 3.02663846427300e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.78983110068262e-1
n = 100 , left side = 1.74104170545998e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.33778226096358e-1
n = 200 , left side = 9.25989196858323e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94768685368254e-1
n = 500 , left side = 3.83481978962907e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51157078965205e-1
```

$\cos(x)$

```
n = 10 , left side = 3.22248031460382e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 1.78939202166890e-1
n = 20 , left side = 1.42602604325762e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.64487927211142e-1
n = 50 , left side = 4.72897971848895e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.61959697526102e-1
n = 100 , left side = 2.16912390801813e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.29497404070777e-1
n = 200 , left side = 1.03316679895296e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.93696909347307e-1
n = 500 , left side = 4.00637442698670e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50985524327847e-1
```

---

x0 = 1/4*pi, Power = 3/10, lamda = 1/4, q = 1

$\sin(x)$

```
n = 10 , left side = 1.55169425547731e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.46017808079542e-1
```

```
n = 20 , left side = 4.47376351803206e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62352896356584e-1
n = 50 , left side = 7.43627371125710e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01813220999735e-1
n = 100 , left side = 1.86936162198503e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49319281528973e-1
n = 200 , left side = 4.67987750301657e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03560589586535e-1
n = 500 , left side = 7.49070874977997e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54916991667336e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.53728257318856e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.47458976308417e-1
n = 20 , left side = 4.47310387031025e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62359492833802e-1
n = 50 , left side = 7.43627371112354e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01813220999868e-1
n = 100 , left side = 1.86936162198525e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49319281528973e-1
n = 200 , left side = 4.67987750301324e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03560589586536e-1
n = 500 , left side = 7.49070874974667e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54916991667336e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.10269377456684e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.90917856170588e-1
n = 20 , left side = 7.76237576737794e-2
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.29466773863125e-1
n = 50 , left side = 3.60961153613111e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.73153379349681e-1
n = 100 , left side = 1.88410272392819e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.32347615911676e-1
n = 200 , left side = 9.61343382830959e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94415143508527e-1
n = 500 , left side = 3.89095422715502e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51100944527679e-1
```

$\cos(x)$

```
n = 10 , left side = 2.51869405006841e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.49317828620431e-1
n = 20 , left side = 1.14542456854608e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.92548074682296e-1
n = 50 , left side = 4.20732317898761e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.67176262921116e-1
n = 100 , left side = 2.03378378667143e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.30850805284244e-1
n = 200 , left side = 9.98779497231439e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94040782364523e-1
n = 500 , left side = 3.95085911348825e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51041039641345e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 3.95100600139322e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.61677173613340e-1
n = 20 , left side = 3.46988342396720e-2
          1/n^(3/10) = 4.07090531536904e-1
```

```
          difference = 3.72391697297232e-1
n = 50 , left side = 1.73741914965689e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.91875303214423e-1
n = 100 , left side = 9.25093740382410e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41937705747134e-1
n = 200 , left side = 4.76419447265519e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99264382864182e-1
n = 500 , left side = 1.93866173914448e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53053237015689e-1
```

$\cos(x)$

```
n = 10 , left side = 1.43310623580410e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.57876610046862e-1
n = 20 , left side = 6.16155530779093e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.45474978458995e-1
n = 50 , left side = 2.17255095716977e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.87523985139294e-1
n = 100 , left side = 1.03403776602990e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.40848265490659e-1
n = 200 , left side = 5.03665536910614e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98991921967731e-1
n = 500 , left side = 1.98226000171697e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53009638753117e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 4.55658979518567e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.55621335675416e-1
n = 20 , left side = 1.17886898348858e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95301841702019e-1
```

```
n = 50 , left side = 1.90462319911511e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07344871511877e-1
n = 100 , left side = 4.76820716817206e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50711822434141e-1
n = 200 , left side = 1.19246801639439e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909330535198e-1
n = 500 , left side = 1.90813536953272e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972817401138e-1
```

$$\cos(x)$$

```
n = 10 , left side = 4.55601836086841e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.55627050018588e-1
n = 20 , left side = 1.17886897702850e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95301841766619e-1
n = 50 , left side = 1.90462319911522e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07344871511877e-1
n = 100 , left side = 4.76820716817428e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50711822434141e-1
n = 200 , left side = 1.19246801639661e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909330535197e-1
n = 500 , left side = 1.90813536955492e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972817401138e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.66430508778088e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.24544182749464e-1
n = 20 , left side = 4.38693273663758e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.63221204170529e-1
n = 50 , left side = 1.88047297835470e-2
```

```
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.90444764927445e-1
        n = 100 , left side = 9.60447473250958e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.41584168418448e-1
        n = 200 , left side = 4.85201986681627e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.99176557470021e-1
        n = 500 , left side = 1.95265780521137e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53039240949622e-1
```

$\cos(x)$

```
        n = 10 , left side = 1.15283010872480e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.85904222754792e-1
        n = 20 , left side = 5.36357377250527e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.53454793811852e-1
        n = 50 , left side = 2.03721756047667e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.88877319106225e-1
        n = 100 , left side = 9.99650884011449e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.41192134310844e-1
        n = 200 , left side = 4.95003918172576e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.99078538155111e-1
        n = 500 , left side = 1.96834138039337e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53023557374440e-1


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$\sin(x)$

```
        n = 10 , left side = 3.37717704676069e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.67415463159665e-1
        n = 20 , left side = 2.07753148869368e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.86315216649968e-1
        n = 50 , left side = 9.21511967883237e-3
                1/n^(3/10) = 3.09249494710992e-1
```

```
          difference = 3.00034375032159e-1
n = 100 , left side = 4.75529633802119e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46433346812937e-1
n = 200 , left side = 2.41425898359438e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01614318353243e-1
n = 500 , left side = 9.74447341997475e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54017451412836e-1
```

$$\cos(x)$$

```
n = 10 , left side = 6.24222476166081e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.38764986010664e-1
n = 20 , left side = 2.80065121964508e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.79084019340454e-1
n = 50 , left side = 1.03752156077472e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.98874279103244e-1
n = 100 , left side = 5.04543146629366e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46143211684664e-1
n = 200 , left side = 2.48679971416932e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01541777622668e-1
n = 500 , left side = 9.86054169944905e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54005844584889e-1
```

---

x0 = 1/4*pi, Power = 3/10, lamda = 1, q = 1

$$\sin(x)$$

```
n = 10 , left side = 1.26576588370484e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.88529574790224e-1
n = 20 , left side = 3.19289527212963e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03897636264775e-1
n = 50 , left side = 5.12151444058695e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08737343266933e-1
```

```
n = 100 , left side = 1.28084179052412e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060558971906e-1
n = 200 , left side = 3.20238618124469e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996553475025e-1
n = 500 , left side = 5.12400106755795e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986774753766e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.26576548275704e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.88529578799702e-1
n = 20 , left side = 3.19289294996883e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03897638586936e-1
n = 50 , left side = 5.12152389308462e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08737342321683e-1
n = 100 , left side = 1.28084061290279e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060559089668e-1
n = 200 , left side = 3.20239758673235e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996553360970e-1
n = 500 , left side = 5.12391080242924e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986774844031e-1
```

---

x0 = 1/4*pi, Power = 1/2, lamda = 1/4, q = 1/4

$$\sin(x)$$

```
n = 10 , left side = 6.14723251420852e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.54755440874753e-1
n = 20 , left side = 1.11294566010310e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.12312231739669e-1
n = 50 , left side = 6.57022757028688e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.57190805344407e-2
n = 100 , left side = 3.61332770545404e-2
```

```
                1/n^(1/2) = 1.00000000000000e-1
                difference = 6.38667229454596e-2
        n = 200 , left side = 1.88501016814132e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 5.18605764372415e-2
        n = 500 , left side = 7.72268598453840e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 3.69986735654574e-2
```

$\cos(x)$

```
        n = 10 , left side = 5.17973276214348e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = -2.01745510197510e-1
        n = 20 , left side = 2.51295039601676e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = -2.76882418516967e-2
        n = 50 , left side = 8.91716716056313e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 5.22496846316782e-2
        n = 100 , left side = 4.20399787268633e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 5.79600212731367e-2
        n = 200 , left side = 2.03292531654996e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 5.03814249531551e-2
        n = 500 , left side = 7.95946134048608e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 3.67618982095097e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$\sin(x)$

```
        n = 10 , left side = 2.25818738884073e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.93645892128431e-1
        n = 20 , left side = 4.04453908761683e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.83161406873811e-1
        n = 50 , left side = 3.02663846427300e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.11154971594579e-1
        n = 100 , left side = 1.74104170545998e-2
                1/n^(1/2) = 1.00000000000000e-1
```

```
                difference = 8.25895829454002e-2
        n = 200 , left side = 9.25989196858323e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.14507861500715e-2
        n = 500 , left side = 3.83481978962907e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.08865397603667e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 3.22248031460382e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = -6.02026544354439e-3
        n = 20 , left side = 1.42602604325762e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = 8.10041934242166e-2
        n = 50 , left side = 4.72897971848895e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 9.41315590524200e-2
        n = 100 , left side = 2.16912390801813e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 7.83087609198187e-2
        n = 200 , left side = 1.03316679895296e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.03790101291252e-2
        n = 500 , left side = 4.00637442698670e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.07149851230091e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.55169425547731e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.61058340469107e-1
        n = 20 , left side = 4.47376351803206e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.78869162569658e-1
        n = 50 , left side = 7.43627371125710e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.33985082526052e-1
        n = 100 , left side = 1.86936162198503e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.81306383780150e-2
```

```
n = 200 , left side = 4.67987750301657e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02426903683531e-2
n = 500 , left side = 7.49070874977997e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46464524624980e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.53728257318856e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.62499508697982e-1
n = 20 , left side = 4.47310387031025e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78875759046876e-1
n = 50 , left side = 7.43627371112354e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33985082526186e-1
n = 100 , left side = 1.86936162198525e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.81306383780148e-2
n = 200 , left side = 4.67987750301324e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02426903683534e-2
n = 500 , left side = 7.49070874974667e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46464524624983e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.10269377456684e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.05958388560154e-1
n = 20 , left side = 7.76237576737794e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.45983040076200e-1
n = 50 , left side = 3.60961153613111e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.05325240875998e-1
n = 100 , left side = 1.88410272392819e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.11589727607181e-2
n = 200 , left side = 9.61343382830959e-3
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.10972442903452e-2
n = 500 , left side = 3.89095422715502e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.08304053228408e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.51869405006841e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 6.43583610099970e-2
n = 20 , left side = 1.14542456854608e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.09064340895371e-1
n = 50 , left side = 4.20732317898761e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.93481244474334e-2
n = 100 , left side = 2.03378378667143e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.96621621332857e-2
n = 200 , left side = 9.98779497231439e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.07228831463404e-2
n = 500 , left side = 3.95085911348825e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.07705004365075e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.95100600139322e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.76717706002906e-1
n = 20 , left side = 3.46988342396720e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88907963510307e-1
n = 50 , left side = 1.73741914965689e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24047164740741e-1
n = 100 , left side = 9.25093740382410e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.07490625961759e-2
n = 200 , left side = 4.76419447265519e-3
          1/n^(1/2) = 7.07106781186548e-2
```

```
                difference = 6.59464836459996e-2
        n = 500 , left side = 1.93866173914448e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27826978108513e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.43310623580410e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.72917142436428e-1
        n = 20 , left side = 6.16155530779093e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.61991244672070e-1
        n = 50 , left side = 2.17255095716977e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.19695846665612e-1
        n = 100 , left side = 1.03403776602990e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.96596223397010e-2
        n = 200 , left side = 5.03665536910614e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.56740227495486e-2
        n = 500 , left side = 1.98226000171697e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27390995482788e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 4.55658979518567e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.70661868064981e-1
        n = 20 , left side = 1.17886898348858e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.11818107915093e-1
        n = 50 , left side = 1.90462319911511e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39516733038194e-1
        n = 100 , left side = 4.76820716817206e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.95231792831828e-2
        n = 200 , left side = 1.19246801639439e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05914313170153e-2
```

```
n = 500 , left side = 1.90813536953272e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47022781963005e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.55601836086841e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.70667582408154e-1
n = 20 , left side = 1.17886897702850e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.11818107979694e-1
n = 50 , left side = 1.90462319911522e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39516733038194e-1
n = 100 , left side = 4.76820716817428e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95231792831826e-2
n = 200 , left side = 1.19246801639661e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05914313170151e-2
n = 500 , left side = 1.90813536955492e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47022781963002e-2
```

---

x0 = 1/4*pi, Power = 1/2, lamda = 1, q = 1/4

$$\sin(x)$$

```
n = 10 , left side = 7.66430508778088e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.39584715139029e-1
n = 20 , left side = 4.38693273663758e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.79737470383603e-1
n = 50 , left side = 1.88047297835470e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.22616626453763e-1
n = 100 , left side = 9.60447473250958e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.03955252674904e-2
n = 200 , left side = 4.85201986681627e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.58586582518385e-2
n = 500 , left side = 1.95265780521137e-3
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27687017447844e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.15283010872480e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.00944755144358e-1
n = 20 , left side = 5.36357377250527e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.69971060024926e-1
n = 50 , left side = 2.03721756047667e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.21049180632543e-1
n = 100 , left side = 9.99650884011449e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.00034911598855e-2
n = 200 , left side = 4.95003918172576e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.57606389369290e-2
n = 500 , left side = 1.96834138039337e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27530181696024e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.37717704676069e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.82455995549231e-1
n = 20 , left side = 2.07753148869368e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.02831482863042e-1
n = 50 , left side = 9.21511967883237e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.32206236558477e-1
n = 100 , left side = 4.75529633802119e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.52447036619788e-2
n = 200 , left side = 2.41425898359438e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.82964191350604e-2
n = 500 , left side = 9.74447341997475e-4
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.37469122079983e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.24222476166081e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.53805518400230e-1
n = 20 , left side = 2.80065121964508e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.95600285553528e-1
n = 50 , left side = 1.03752156077472e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.31046140629562e-1
n = 100 , left side = 5.04543146629366e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.49545685337063e-2
n = 200 , left side = 2.48679971416932e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.82238784044854e-2
n = 500 , left side = 9.86054169944905e-4
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.37353053800509e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.26576588370484e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 3.03570107179790e-1
n = 20 , left side = 3.19289527212963e-3
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.20413902477849e-1
n = 50 , left side = 5.12151444058695e-4
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.40909204793251e-1
n = 100 , left side = 1.28084179052412e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.98719158209476e-2
n = 200 , left side = 3.20238618124469e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06786542568423e-2
n = 500 , left side = 5.12400106755795e-6
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162355489282e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.26576548275704e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.03570111189268e-1
n = 20 , left side = 3.19289294996883e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20413904800010e-1
n = 50 , left side = 5.12152389308462e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40909203848001e-1
n = 100 , left side = 1.28084061290279e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719159387097e-2
n = 200 , left side = 3.20239758673235e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06786541427874e-2
n = 500 , left side = 5.12391080242924e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162356391934e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.14723251420852e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.38053906354803e-1
n = 20 , left side = 1.11294566010310e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.15282366012690e-2
n = 50 , left side = 6.57022757028688e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.02957504513304e-3
n = 100 , left side = 3.61332770545404e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.67744000080934e-3
n = 200 , left side = 1.88501016814132e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 5.65626926556129e-3
n = 500 , left side = 7.72268598453840e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 5.18121425842592e-3
```

$$\cos(x)$$

```
n = 10 , left side = 5.17973276214348e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = -3.18447044717460e-1
n = 20 , left side = 2.51295039601676e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = -1.28472236990097e-1
n = 50 , left side = 8.91716716056313e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = -2.44989709478956e-2
n = 100 , left side = 4.20399787268633e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = -2.22926167151354e-3
n = 200 , left side = 2.03292531654996e-2
                1/n^(7/10) = 2.45063709469745e-2
                difference = 4.17711778147490e-3
n = 500 , left side = 7.95946134048608e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 4.94443890247824e-3


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.25818738884073e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.76944357608481e-1
n = 20 , left side = 4.04453908761683e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 8.23774117354108e-2
n = 50 , left side = 3.02663846427300e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 3.44063160150057e-2
n = 100 , left side = 1.74104170545998e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.24003000007500e-2
n = 200 , left side = 9.25989196858323e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.52464789783913e-2
n = 500 , left side = 3.83481978962907e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.06908045333525e-3
```

$$\cos(x)$$

```
n = 10 , left side = 3.22248031460382e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.22721799963494e-1
n = 20 , left side = 1.42602604325762e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.97798017141833e-2
n = 50 , left side = 4.72897971848895e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.73829034728463e-2
n = 100 , left side = 2.16912390801813e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.81194779751684e-2
n = 200 , left side = 1.03316679895296e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.41747029574449e-2
n = 500 , left side = 4.00637442698670e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.89752581597762e-3
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.55169425547731e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 4.43568059491574e-2
n = 20 , left side = 4.47376351803206e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.80851674312585e-2
n = 50 , left side = 7.43627371125710e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.72364269464787e-2
n = 100 , left side = 1.86936162198503e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.79413554333647e-2
n = 200 , left side = 4.67987750301657e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40383831966728e-2
n = 500 , left side = 7.49070874977997e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28289931554665e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.53728257318856e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 4.57979741780322e-2
        n = 20 , left side = 4.47310387031025e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 7.80917639084766e-2
        n = 50 , left side = 7.43627371112354e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.72364269466122e-2
        n = 100 , left side = 1.86936162198525e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.79413554333645e-2
        n = 200 , left side = 4.67987750301324e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.40383831966732e-2
        n = 500 , left side = 7.49070874974667e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28289931554669e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.10269377456684e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 8.92568540402037e-2
        n = 20 , left side = 7.76237576737794e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 4.51990449377997e-2
        n = 50 , left side = 3.60961153613111e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 2.85765852964247e-2
        n = 100 , left side = 1.88410272392819e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.09696898160678e-2
        n = 200 , left side = 9.61343382830959e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.48929371186649e-2
        n = 500 , left side = 3.89095422715502e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 9.01294601580930e-3
```

$$\cos(x)$$

```
        n = 10 , left side = 2.51869405006841e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = -5.23431735099530e-2
        n = 20 , left side = 1.14542456854608e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = 8.28034575697098e-3
        n = 50 , left side = 4.20732317898761e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 2.25994688678597e-2
        n = 100 , left side = 2.03378378667143e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 1.94728791886355e-2
        n = 200 , left side = 9.98779497231439e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.45185759746601e-2
        n = 500 , left side = 3.95085911348825e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 8.95304112947608e-3


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 3.95100600139322e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.60016171482956e-1
        n = 20 , left side = 3.46988342396720e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 8.81239683719070e-2
        n = 50 , left side = 1.73741914965689e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.72985091611668e-2
        n = 100 , left side = 9.25093740382410e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.05597796515256e-2
        n = 200 , left side = 4.76419447265519e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.97421764743193e-2
        n = 500 , left side = 1.93866173914448e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09652385038198e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.43310623580410e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 5.62156079164781e-2
        n = 20 , left side = 6.16155530779093e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 6.12072495336697e-2
        n = 50 , left side = 2.17255095716977e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.29471910860380e-2
        n = 100 , left side = 1.03403776602990e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.94703393950507e-2
        n = 200 , left side = 5.03665536910614e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.94697155778684e-2
        n = 500 , left side = 1.98226000171697e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09216402412474e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 4.55658979518567e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.53960333545031e-1
        n = 20 , left side = 1.17886898348858e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.11034112776693e-1
        n = 50 , left side = 1.90462319911511e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.27680774586206e-2
        n = 100 , left side = 4.76820716817206e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.93338963385325e-2
        n = 200 , left side = 1.19246801639439e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43871241453351e-2
        n = 500 , left side = 1.90813536953272e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28848188892690e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 4.55601836086841e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.53966047888204e-1
        n = 20 , left side = 1.17886897702850e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.11034112841294e-1
        n = 50 , left side = 1.90462319911522e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.27680774586205e-2
        n = 100 , left side = 4.76820716817428e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.93338963385323e-2
        n = 200 , left side = 1.19246801639661e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43871241453348e-2
        n = 500 , left side = 1.90813536955492e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28848188892688e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 7.66430508778088e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.22883180619079e-1
        n = 20 , left side = 4.38693273663758e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 7.89534752452032e-2
        n = 50 , left side = 1.88047297835470e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.58679708741888e-2
        n = 100 , left side = 9.60447473250958e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.02062423228402e-2
        n = 200 , left side = 4.85201986681627e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.96543510801582e-2
        n = 500 , left side = 1.95265780521137e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09512424377530e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.15283010872480e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 8.42432206244081e-2
        n = 20 , left side = 5.36357377250527e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 6.91870648865263e-2
        n = 50 , left side = 2.03721756047667e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.43005250529691e-2
        n = 100 , left side = 9.99650884011449e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.98142082152352e-2
        n = 200 , left side = 4.95003918172576e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.95563317652487e-2
        n = 500 , left side = 1.96834138039337e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09355588625710e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 3.37717704676069e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.65754461029281e-1
        n = 20 , left side = 2.07753148869368e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.02047487724642e-1
        n = 50 , left side = 9.21511967883237e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.54575809789034e-2
        n = 100 , left side = 4.75529633802119e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.50554207173285e-2
        n = 200 , left side = 2.41425898359438e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.20921119633801e-2
        n = 500 , left side = 9.74447341997475e-4
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19294529009668e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.24222476166081e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.37103983880280e-1
n = 20 , left side = 2.80065121964508e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.48162904151283e-2
n = 50 , left side = 1.03752156077472e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.42974850499885e-2
n = 100 , left side = 5.04543146629366e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.47652855890561e-2
n = 200 , left side = 2.48679971416932e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20195712328052e-2
n = 500 , left side = 9.86054169944905e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19178460730194e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.26576588370484e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.86868572659840e-1
n = 20 , left side = 3.19289527212963e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19629907339449e-1
n = 50 , left side = 5.12151444058695e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41605492136771e-2
n = 100 , left side = 1.28084179052412e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826328762973e-2
n = 200 , left side = 3.20238618124469e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44743470851621e-2
n = 500 , left side = 5.12400106755795e-6
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28987762418968e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.26576548275704e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.86868576669318e-1
        n = 20 , left side = 3.19289294996883e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.19629909661610e-1
        n = 50 , left side = 5.12152389308462e-4
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.41605482684273e-2
        n = 100 , left side = 1.28084061290279e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.96826329940595e-2
        n = 200 , left side = 3.20239758673235e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44743469711072e-2
        n = 500 , left side = 5.12391080242924e-6
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28987763321619e-2


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.59670416080878e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 2.41516817546394e-1
        n = 20 , left side = 9.72188312719504e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.09871700264954e-1
        n = 50 , left side = 1.65953574461681e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.92654137264824e-1
        n = 100 , left side = 4.17666880694489e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.47011974344013e-1
        n = 200 , left side = 1.04591804479937e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.02982659292038e-1
        n = 500 , left side = 1.67425459808412e-4
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54824473295025e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 3.74820144167218e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 1.26367089460054e-1
        n = 20 , left side = 2.55195709786687e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 1.51894821750217e-1
        n = 50 , left side = 1.09512408851853e-1
                1/n^(3/10) = 3.09249494710992e-1
                difference = 1.99737085859139e-1
        n = 100 , left side = 5.52768392704612e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 1.95911803880497e-1
        n = 200 , left side = 2.77039874947656e-2
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.76324589842071e-1
        n = 500 , left side = 1.10889527170912e-2
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.43902946037742e-1


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.09589580757104e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 2.91597652870168e-1
        n = 20 , left side = 7.13255649254819e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.35764966611423e-1
        n = 50 , left side = 1.20373646494268e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.97212130061565e-1
        n = 100 , left side = 3.02699828334163e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.48161644867616e-1
        n = 200 , left side = 7.57860092323814e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03270717244513e-1
        n = 500 , left side = 1.21307447419339e-4
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54870591307414e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.87736124441305e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.13451109185968e-1
        n = 20 , left side = 1.28731714979751e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 2.78358816557153e-1
        n = 50 , left side = 5.48404970391369e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.54408997671855e-1
        n = 100 , left side = 2.76490462085282e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.23539596942430e-1
        n = 200 , left side = 1.38533249004043e-2
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.90175252436433e-1
        n = 500 , left side = 5.54456160316980e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.49447337151664e-1


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.00900395201895e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.00286838425377e-1
        n = 20 , left side = 6.28049320488506e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.44285599488054e-1
        n = 50 , left side = 1.05164762327522e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.98733018478240e-1
        n = 100 , left side = 2.64367655879127e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.48544966592167e-1
        n = 200 , left side = 6.61834623500557e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03366742713336e-1
        n = 500 , left side = 1.05934619056391e-4
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54885964135777e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.66610983054087e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.84526135321864e-1
        n = 20 , left side = 4.09990480435282e-4
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.06680541056469e-1
        n = 50 , left side = 2.67487880780225e-9
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.09249492036113e-1
        n = 100 , left side = 8.64395924369672e-18
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51188643150958e-1
        n = 200 , left side = 1.45283091113058e-17
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.04028577336837e-1
        n = 500 , left side = 8.94627014169001e-17
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54991898754834e-1


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 9.84826134043599e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.02704620222912e-1
        n = 20 , left side = 2.61046861206300e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.80985845416274e-1
        n = 50 , left side = 4.22645955857959e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.05023035152412e-1
        n = 100 , left side = 1.05840494480958e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50130238206148e-1
        n = 200 , left side = 2.64713303538389e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03763864033299e-1
        n = 500 , left side = 4.23591513527555e-5
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54949539603481e-1
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457693e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.46187995169579e-1
n = 20 , left side = 1.35881405538451e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.71209125998454e-1
n = 50 , left side = 5.52740754515297e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53975419259462e-1
n = 100 , left side = 2.77036411956434e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23485001955315e-1
n = 200 , left side = 1.38601618045097e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90168415532327e-1
n = 500 , left side = 5.54499938996761e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446899364866e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486467e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.28631132978626e-1
n = 20 , left side = 1.90326036120037e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.88057927924901e-1
n = 50 , left side = 3.07684651802320e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06172648192969e-1
n = 100 , left side = 7.70350593050639e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50418292557907e-1
n = 200 , left side = 1.92658947488877e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03835918389348e-1
n = 500 , left side = 3.08286271132330e-5
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54961070127720e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72544743619751e-1
n = 20 , left side = 6.81042176000300e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.38986313936874e-1
n = 50 , left side = 2.76476637677382e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81601830943254e-1
n = 100 , left side = 1.38531517342038e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37335491416754e-1
n = 200 , left side = 6.93024738450047e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97098329952337e-1
n = 500 , left side = 2.77251035146457e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219388403369e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492422e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37175724978030e-1
n = 20 , left side = 1.66715291654219e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90419002371483e-1
n = 50 , left side = 2.69354395939936e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06555950751592e-1
n = 100 , left side = 6.74326324543562e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50514316826414e-1
n = 200 , left side = 1.68640444147994e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03859936892689e-1
n = 500 , left side = 2.69851091845297e-5
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54964913645649e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 3.68331709595509e-4
                1/n^(3/10) = 5.01187233627272e-1
                difference = 5.00818901917677e-1
        n = 20 , left side = 1.81936348575529e-7
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.07090349600556e-1
        n = 50 , left side = 1.15053485964214e-17
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.09249494710992e-1
        n = 100 , left side = 2.66498756652580e-17
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51188643150958e-1
        n = 200 , left side = 2.17356323014423e-17
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.04028577336837e-1
        n = 500 , left side = 9.06911543942942e-17
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54991898754834e-1


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.73218987411664e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.73865334886106e-1
        n = 20 , left side = 6.90589468087832e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.00184636856026e-1
        n = 50 , left side = 1.10835163775835e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08141143073233e-1
        n = 100 , left side = 2.77209959256730e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50911433191701e-1
        n = 200 , left side = 6.93101217305037e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03959267215106e-1
        n = 500 , left side = 1.10899618150917e-5
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54980808793019e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.35711685154782e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.65475548472490e-1
        n = 20 , left side = 6.89464901817200e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.38144041355184e-1
        n = 50 , left side = 2.77022557225577e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.81547238988434e-1
        n = 100 , left side = 1.38599886244430e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.37328654526515e-1
        n = 200 , left side = 6.93110233963074e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.97097474997206e-1
        n = 500 , left side = 2.77256501313648e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.52219333741697e-1


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.02586050377557e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.80928628589517e-1
        n = 20 , left side = 5.11322907698708e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.01977302459917e-1
        n = 50 , left side = 8.20311672977803e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08429183038014e-1
        n = 100 , left side = 2.05156512414262e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50983486638544e-1
        n = 200 , left side = 5.12940438195386e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03977283293017e-1
        n = 500 , left side = 8.20726742567501e-6
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54983691487408e-1
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.33168075685853e-1
n = 20 , left side = 3.44939608010511e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72596570735853e-1
n = 50 , left side = 1.38524597520624e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95397034958929e-1
n = 100 , left side = 6.93016042367867e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44258482727279e-1
n = 200 , left side = 3.46557187207865e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00563005464758e-1
n = 500 , left side = 1.38628390798492e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53605614846849e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 3/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.83286775969330e-1
n = 20 , left side = 4.51543399532339e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.02575097541581e-1
n = 50 , left side = 7.24292150886985e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08525202560105e-1
n = 100 , left side = 1.81138319373719e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51007504831584e-1
n = 200 , left side = 4.52886594521917e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03983288677385e-1
n = 500 , left side = 7.24636777071908e-6
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54984652387063e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523854596e-7
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.01187075757748e-1
n = 20 , left side = 8.57307835911959e-10
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07090530679597e-1
n = 50 , left side = 1.66778327101737e-10
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494544213e-1
n = 100 , left side = 1.61355729577713e-10
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188642989602e-1
n = 200 , left side = 1.41525502993151e-10
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577195311e-1
n = 500 , left side = 4.01468513110386e-11
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898714687e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.59670416080878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 5.65573499359598e-2
n = 20 , left side = 9.72188312719504e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.26387966478029e-1
n = 50 , left side = 1.65953574461681e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24825998791141e-1
n = 100 , left side = 4.17666880694489e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.58233311930551e-2
n = 200 , left side = 1.04591804479937e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.96647600738554e-2
n = 500 , left side = 1.67425459808412e-4
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45539340901874e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.74820144167218e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = -5.85923781503805e-2
n = 20 , left side = 2.55195709786687e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -3.15889120367084e-2
n = 50 , left side = 1.09512408851853e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 3.19089473854569e-2
n = 100 , left side = 5.52768392704612e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.47231607295388e-2
n = 200 , left side = 2.77039874947656e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.30066906238892e-2
n = 500 , left side = 1.10889527170912e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.36324068329046e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09589580757104e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.06638185259734e-1
n = 20 , left side = 7.13255649254819e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.52281232824497e-1
n = 50 , left side = 1.20373646494268e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.29383991587883e-1
n = 100 , left side = 3.02699828334163e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.69730017166584e-2
n = 200 , left side = 7.57860092323814e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.99528180263309e-2
n = 500 , left side = 1.21307447419339e-4
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46000521025765e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.87736124441305e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.28491641575533e-1
n = 20 , left side = 1.28731714979751e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 9.48750827702277e-2
n = 50 , left side = 5.48404970391369e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.65808591981726e-2
n = 100 , left side = 2.76490462085282e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.23509537914718e-2
n = 200 , left side = 1.38533249004043e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68573532182505e-2
n = 500 , left side = 5.54456160316980e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91767979468260e-2


-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00900395201895e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.15327370814943e-1
n = 20 , left side = 6.28049320488506e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.60801865701128e-1
n = 50 , left side = 1.05164762327522e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.30904880004557e-1
n = 100 , left side = 2.64367655879127e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.73563234412087e-2
n = 200 , left side = 6.61834623500557e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.00488434951542e-2
n = 500 , left side = 1.05934619056391e-4
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46154249309394e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.66610983054087e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.99566667711429e-1
n = 20 , left side = 4.09990480435282e-4
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23196807269544e-1
n = 50 , left side = 2.67487880780225e-9
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421353562431e-1
n = 100 , left side = 8.64395924369672e-18
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 1.45283091113058e-17
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186547e-2
n = 500 , left side = 8.94627014169001e-17
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2


-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 9.84826134043599e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.17745152612478e-1
n = 20 , left side = 2.61046861206300e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.97502111629349e-1
n = 50 , left side = 4.22645955857959e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.37194896678730e-1
n = 100 , left side = 1.05840494480958e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.89415950551904e-2
n = 200 , left side = 2.64713303538389e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04459648151164e-2
n = 500 , left side = 4.23591513527555e-5
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46790003986430e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457693e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 6.12285275591446e-2
n = 20 , left side = 1.35881405538451e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.77253922115282e-2
n = 50 , left side = 5.52740754515297e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.61472807857798e-2
n = 100 , left side = 2.77036411956434e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.22963588043566e-2
n = 200 , left side = 1.38601618045097e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68505163141450e-2
n = 500 , left side = 5.54499938996761e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91763601600282e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486467e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.43671665368191e-1
n = 20 , left side = 1.90326036120037e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.04574194137975e-1
n = 50 , left side = 3.07684651802320e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38344509719286e-1
n = 100 , left side = 7.70350593050639e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.92296494069494e-2
n = 200 , left side = 1.92658947488877e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05180191711659e-2
n = 500 , left side = 3.08286271132330e-5
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46905309228826e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87585276009317e-1
n = 20 , left side = 6.81042176000300e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.55502580149949e-1
n = 50 , left side = 2.76476637677382e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13773692469571e-1
n = 100 , left side = 1.38531517342038e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61468482657962e-2
n = 200 , left side = 6.93024738450047e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37804307341543e-2
n = 500 , left side = 2.77251035146457e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19488491985312e-2


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492422e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52216257367596e-1
n = 20 , left side = 1.66715291654219e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.06935268584557e-1
n = 50 , left side = 2.69354395939936e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38727812277910e-1
n = 100 , left side = 6.74326324543562e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.93256736754564e-2
n = 200 , left side = 1.68640444147994e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05420376745068e-2
n = 500 , left side = 2.69851091845297e-5
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46943744408113e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 3.68331709595509e-4
                1/n^(1/2) = 3.16227766016838e-1
                difference = 3.15859434307242e-1
        n = 20 , left side = 1.81936348575529e-7
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.23606615813630e-1
        n = 50 , left side = 1.15053485964214e-17
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.41421356237310e-1
        n = 100 , left side = 2.66498756652580e-17
                1/n^(1/2) = 1.00000000000000e-1
                difference = 1.00000000000000e-1
        n = 200 , left side = 2.17356323014423e-17
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.07106781186547e-2
        n = 500 , left side = 9.06911543942942e-17
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47213595499957e-2


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.73218987411664e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.88905867275672e-1
        n = 20 , left side = 6.90589468087832e-3
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.16700903069101e-1
        n = 50 , left side = 1.10835163775835e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.40313004599551e-1
        n = 100 , left side = 2.77209959256730e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.97227900407433e-2
        n = 200 , left side = 6.93101217305037e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06413679969242e-2
        n = 500 , left side = 1.10899618150917e-5
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47102695881807e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.35711685154782e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.80516080862056e-1
n = 20 , left side = 6.89464901817200e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.54660307568259e-1
n = 50 , left side = 2.77022557225577e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.13719100514752e-1
n = 100 , left side = 1.38599886244430e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.61400113755570e-2
n = 200 , left side = 6.93110233963074e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.37795757790240e-2
n = 500 , left side = 2.77256501313648e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.19487945368593e-2


-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377557e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.95969160979082e-1
n = 20 , left side = 5.11322907698708e-3
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.18493568672992e-1
n = 50 , left side = 8.20311672977803e-4
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.40601044564332e-1
n = 100 , left side = 2.05156512414262e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.97948434875857e-2
n = 200 , left side = 5.12940438195386e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06593840748352e-2
n = 500 , left side = 8.20726742567501e-6
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47131522825701e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.48208608075418e-1
n = 20 , left side = 3.44939608010511e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.89112836948928e-1
n = 50 , left side = 1.38524597520624e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27568896485247e-1
n = 100 , left side = 6.93016042367867e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30698395763213e-2
n = 200 , left side = 3.46557187207865e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72451062465761e-2
n = 500 , left side = 1.38628390798492e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33350756420109e-2


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.98327308358895e-1
n = 20 , left side = 4.51543399532339e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.19091363754656e-1
n = 50 , left side = 7.24292150886985e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40697064086423e-1
n = 100 , left side = 1.81138319373719e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98188616806263e-2
n = 200 , left side = 4.52886594521917e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06653894592026e-2
n = 500 , left side = 7.24636777071908e-6
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47141131822251e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.57869523854596e-7
                1/n^(1/2) = 3.16227766016838e-1
                difference = 3.16227608147314e-1
        n = 20 , left side = 8.57307835911959e-10
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.23606796892671e-1
        n = 50 , left side = 1.66778327101737e-10
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.41421356070531e-1
        n = 100 , left side = 1.61355729577713e-10
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.99999998386443e-2
        n = 200 , left side = 1.41525502993151e-10
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.07106779771293e-2
        n = 500 , left side = 4.01468513110386e-11
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47213595098489e-2


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.59670416080878e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = -6.01441845839902e-2
        n = 20 , left side = 9.72188312719504e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 2.56039713396286e-2
        n = 50 , left side = 1.65953574461681e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.80773432115676e-2
        n = 100 , left side = 4.17666880694489e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.56340482484048e-2
        n = 200 , left side = 1.04591804479937e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.34604529021751e-2
        n = 500 , left side = 1.67425459808412e-4
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27364747831559e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.74820144167218e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.75293912670330e-1
n = 20 , left side = 2.55195709786687e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.32372907175108e-1
n = 50 , left side = 1.09512408851853e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -4.48397081941169e-2
n = 100 , left side = 5.52768392704612e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -1.54661222151115e-2
n = 200 , left side = 2.77039874947656e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -3.19761654779109e-3
n = 500 , left side = 1.10889527170912e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.81494752587308e-3
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09589580757104e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.00633492602161e-2
n = 20 , left side = 7.13255649254819e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.14972376860971e-2
n = 50 , left side = 1.20373646494268e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.26353360083089e-2
n = 100 , left side = 3.02699828334163e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.67837187720081e-2
n = 200 , left side = 7.57860092323814e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.37485108546507e-2
n = 500 , left side = 1.21307447419339e-4
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27825927955450e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.87736124441305e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.17901070555831e-2
n = 20 , left side = 1.28731714979751e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.90891236817218e-3
n = 50 , left side = 5.48404970391369e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.83220361859886e-3
n = 100 , left side = 2.76490462085282e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.21616708468215e-2
n = 200 , left side = 1.38533249004043e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06530460465702e-2
n = 500 , left side = 5.54456160316980e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35933863979452e-3
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00900395201895e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.37416370500729e-3
n = 20 , left side = 6.28049320488506e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.00178705627284e-2
n = 50 , left side = 1.05164762327522e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.41562244249836e-2
n = 100 , left side = 2.64367655879127e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.71670404965585e-2
n = 200 , left side = 6.61834623500557e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.38445363234739e-2
n = 500 , left side = 1.05934619056391e-4
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.27979656239079e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.66610983054087e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.82865133191479e-1
        n = 20 , left side = 4.09990480435282e-4
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.22412812131144e-1
        n = 50 , left side = 2.67487880780225e-9
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.46726979828569e-2
        n = 100 , left side = 8.64395924369672e-18
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.98107170553497e-2
        n = 200 , left side = 1.45283091113058e-17
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.45063709469745e-2
        n = 500 , left side = 8.94627014169001e-17
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.29039002429642e-2


-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 9.84826134043599e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.01043618092528e-1
        n = 20 , left side = 2.61046861206300e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 9.67181164909491e-2
        n = 50 , left side = 4.22645955857959e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.04462410991562e-2
        n = 100 , left side = 1.05840494480958e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.87523121105402e-2
        n = 200 , left side = 2.64713303538389e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.42416576434361e-2
        n = 500 , left side = 4.23591513527555e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28615410916116e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 2.54999238457693e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = -5.54730069608053e-2
        n = 20 , left side = 1.35881405538451e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = -1.30586029268717e-2
        n = 50 , left side = 5.52740754515297e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 9.39862520620604e-3
        n = 100 , left side = 2.77036411956434e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 1.21070758597063e-2
        n = 200 , left side = 1.38601618045097e-2
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.06462091424648e-2
        n = 500 , left side = 5.54499938996761e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 7.35890085299672e-3


-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 7.25561006486467e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.26970130848241e-1
        n = 20 , left side = 1.90326036120037e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.03790198999575e-1
        n = 50 , left side = 3.07684651802320e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.15958541397126e-2
        n = 100 , left side = 7.70350593050639e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.90403664622991e-2
        n = 200 , left side = 1.92658947488877e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43137119994856e-2
        n = 500 , left side = 3.08286271132330e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28730716158511e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.28642490007521e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 7.08837414893666e-2
        n = 20 , left side = 6.81042176000300e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 5.47185850115491e-2
        n = 50 , left side = 2.76476637677382e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 3.70250368899976e-2
        n = 100 , left side = 1.38531517342038e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.59575653211459e-2
        n = 200 , left side = 6.93024738450047e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.75761235624740e-2
        n = 500 , left side = 2.77251035146457e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.01313898914998e-2


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 6.40115086492422e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.35514722847646e-1
        n = 20 , left side = 1.66715291654219e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.06151273446157e-1
        n = 50 , left side = 2.69354395939936e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.19791566983364e-2
        n = 100 , left side = 6.74326324543562e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.91363907308062e-2
        n = 200 , left side = 1.68640444147994e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43377305028265e-2
        n = 500 , left side = 2.69851091845297e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28769151337798e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 3.68331709595509e-4
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.99157899787292e-1
        n = 20 , left side = 1.81936348575529e-7
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.22822620675230e-1
        n = 50 , left side = 1.15053485964214e-17
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.46727006577357e-2
        n = 100 , left side = 2.66498756652580e-17
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.98107170553497e-2
        n = 200 , left side = 2.17356323014423e-17
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.45063709469745e-2
        n = 500 , left side = 9.06911543942942e-17
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.29039002429642e-2


--------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.73218987411664e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.72204332755722e-1
        n = 20 , left side = 6.90589468087832e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.15916907930701e-1
        n = 50 , left side = 1.10835163775835e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.35643490199774e-2
        n = 100 , left side = 2.77209959256730e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.95335070960930e-2
        n = 200 , left side = 6.93101217305037e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44370608252440e-2
        n = 500 , left side = 1.10899618150917e-5
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28928102811492e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.35711685154782e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.38145463421060e-2
n = 20 , left side = 6.89464901817200e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.38763124298591e-2
n = 50 , left side = 2.77022557225577e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69704449351780e-2
n = 100 , left side = 1.38599886244430e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59507284309068e-2
n = 200 , left side = 6.93110233963074e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75752686073438e-2
n = 500 , left side = 2.77256501313648e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313352298278e-2


-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377557e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79267626459132e-1
n = 20 , left side = 5.11322907698708e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17709573534592e-1
n = 50 , left side = 8.20311672977803e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.38523889847580e-2
n = 100 , left side = 2.05156512414262e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96055605429355e-2
n = 200 , left side = 5.12940438195386e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44550769031550e-2
n = 500 , left side = 8.20726742567501e-6
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28956929755386e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.31507073555468e-1
n = 20 , left side = 3.44939608010511e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.83288418105280e-2
n = 50 , left side = 1.38524597520624e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.08202409056733e-2
n = 100 , left side = 6.93016042367867e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.28805566316711e-2
n = 200 , left side = 3.46557187207865e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10407990748959e-2
n = 500 , left side = 1.38628390798492e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15176163349794e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2*pi, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.81625773838945e-1
n = 20 , left side = 4.51543399532339e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.18307368616256e-1
n = 50 , left side = 7.24292150886985e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.39484085068488e-2
n = 100 , left side = 1.81138319373719e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96295787359760e-2
n = 200 , left side = 4.52886594521917e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44610822875223e-2
n = 500 , left side = 7.24636777071908e-6
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28966538751936e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523854596e-7
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.99526073627364e-1
n = 20 , left side = 8.57307835911959e-10
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.22822801754271e-1
n = 50 , left side = 1.66778327101737e-10
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.46727004909574e-2
n = 100 , left side = 1.61355729577713e-10
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.98107168939940e-2
n = 200 , left side = 1.41525502993151e-10
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.45063708054490e-2
n = 500 , left side = 4.01468513110386e-11
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.29039002028175e-2


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.98204373198907e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.02982860428365e-1
n = 20 , left side = 1.96093741108132e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 2.10996790428773e-1
n = 50 , left side = 8.90320175478233e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.20217477163168e-1
n = 100 , left side = 4.20399709374283e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.09148672213530e-1
n = 200 , left side = 2.03292531654996e-2
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.83699324171337e-1
n = 500 , left side = 7.95946134048608e-3
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.47032437414348e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 2.08515361670426e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.80335697460230e-1
        n = 20 , left side = 9.88652172815406e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.08225314255364e-1
        n = 50 , left side = 6.56587485923281e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.43590746118664e-1
        n = 100 , left side = 3.61332742512769e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.15055368899681e-1
        n = 200 , left side = 1.88501016814133e-2
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.85178475655424e-1
        n = 500 , left side = 7.72268598453885e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.47269212770295e-1


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.16451550382340e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.84735683244932e-1
        n = 20 , left side = 1.10466828745202e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 2.96623702791702e-1
        n = 50 , left side = 4.72158292711957e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.62033665439796e-1
        n = 100 , left side = 2.16912350736221e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.29497408077336e-1
        n = 200 , left side = 1.03316679895289e-2
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.93696909347308e-1
        n = 500 , left side = 4.00637442698637e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50985524327847e-1
```

$$\cos(x)$$

```
n = 10 , left side = 7.05368783489744e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.30650355278298e-1
n = 20 , left side = 3.11241153770572e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.75966416159847e-1
n = 50 , left side = 3.02411171988277e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79008377512164e-1
n = 100 , left side = 1.74104155500615e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.33778227600897e-1
n = 200 , left side = 9.25989196858301e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94768685368254e-1
n = 500 , left side = 3.83481978962918e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51157078965205e-1
```

```
-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.99818810563318e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.71205352570941e-1
n = 20 , left side = 2.65906171704119e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.80499914366493e-1
n = 50 , left side = 7.39731951736688e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01852175193625e-1
n = 100 , left side = 1.86935956423195e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49319283586726e-1
n = 200 , left side = 4.67987750301657e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03560589586535e-1
n = 500 , left side = 7.49070874981328e-5
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54916991667336e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.98513950706237e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.02673282921035e-1
        n = 20 , left side = 5.12486343061099e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.55841897230795e-1
        n = 50 , left side = 7.45077142524186e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.01798723285750e-1
        n = 100 , left side = 1.86936242723723e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.49319280723721e-1
        n = 200 , left side = 4.67987750301213e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03560589586536e-1
        n = 500 , left side = 7.49070874971336e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54916991667337e-1


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.00168857534962e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.01018376092311e-1
        n = 20 , left side = 1.13262072722325e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 2.93828458814580e-1
        n = 50 , left side = 4.20732246994345e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.67176270011557e-1
        n = 100 , left side = 2.03378378667145e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.30850805284244e-1
        n = 200 , left side = 9.98779497231361e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.94040782364523e-1
        n = 500 , left side = 3.95085911348814e-3
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.51041039641346e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 9.93951714238188e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.01792062203454e-1
        n = 20 , left side = 7.72328322774641e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.29857699259440e-1
        n = 50 , left side = 3.60961128316282e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.73153381879364e-1
        n = 100 , left side = 1.88410272392819e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.32347615911676e-1
        n = 200 , left side = 9.61343382830915e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.94415143508528e-1
        n = 500 , left side = 3.89095422715413e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.51100944527680e-1


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.13322309591825e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.87864924035447e-1
        n = 20 , left side = 6.09253390188929e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.46165192518012e-1
        n = 50 , left side = 2.17255059254715e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.87523988785520e-1
        n = 100 , left side = 1.03403776602988e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.40848265490659e-1
        n = 200 , left side = 5.03665536910625e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.98991921967731e-1
        n = 500 , left side = 1.98226000171697e-3
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53009638753117e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 3.12663766609829e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.69920856966289e-1
        n = 20 , left side = 3.44627783783419e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.72627753158563e-1
        n = 50 , left side = 1.73741901387924e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.91875304572199e-1
        n = 100 , left side = 9.25093740382410e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.41937705747134e-1
        n = 200 , left side = 4.76419447265497e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.99264382864182e-1
        n = 500 , left side = 1.93866173914381e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53053237015690e-1


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.86823828109785e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.72504850816294e-1
        n = 20 , left side = 1.14200334403045e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.95670498096600e-1
        n = 50 , left side = 1.90462132680702e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.07344873384185e-1
        n = 100 , left side = 4.76820716816984e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50711822434141e-1
        n = 200 , left side = 1.19246801639328e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03909330535198e-1
        n = 500 , left side = 1.90813536953272e-5
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54972817401138e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 5.13589058368011e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.49828327790471e-1
        n = 20 , left side = 1.19286950374290e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.95161836499475e-1
        n = 50 , left side = 1.90462392585300e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.07344870785139e-1
        n = 100 , left side = 4.76820716817539e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50711822434140e-1
        n = 200 , left side = 1.19246801639328e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03909330535198e-1
        n = 500 , left side = 1.90813536955492e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54972817401138e-1


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.14144646548721e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.87042587078551e-1
        n = 20 , left side = 5.36350821680255e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.53455449368879e-1
        n = 50 , left side = 2.03721764988825e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.88877318212109e-1
        n = 100 , left side = 9.99650895754667e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.41192134193411e-1
        n = 200 , left side = 4.95003907205904e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.99078538264778e-1
        n = 500 , left side = 1.96834136039681e-3
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53023557394437e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 7.63132390190498e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.24873994608223e-1
        n = 20 , left side = 4.38690929008562e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.63221438636048e-1
        n = 50 , left side = 1.88047305777049e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.90444764133287e-1
        n = 100 , left side = 9.60447484518001e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.41584168305778e-1
        n = 200 , left side = 4.85201975765448e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.99176557579182e-1
        n = 500 , left side = 1.95265778643017e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53039240968404e-1


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 6.18104658618466e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.39376767765426e-1
        n = 20 , left side = 2.80061711992697e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.79084360337635e-1
        n = 50 , left side = 1.03752156519759e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.98874279059016e-1
        n = 100 , left side = 5.04543144574432e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.46143211705214e-1
        n = 200 , left side = 2.48679978426469e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.01541777552572e-1
        n = 500 , left side = 9.86054094335276e-4
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54005844660498e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 3.35723331340524e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.67614900493220e-1
        n = 20 , left side = 2.07751849096547e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.86315346627250e-1
        n = 50 , left side = 9.21511983819834e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.00034374872793e-1
        n = 100 , left side = 4.75529632502614e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.46433346825932e-1
        n = 200 , left side = 2.41425905034909e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.01614318286488e-1
        n = 500 , left side = 9.74447265982614e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54017451488851e-1


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.23317176677876e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.88855515959485e-1
        n = 20 , left side = 3.19271958223943e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.03897811954665e-1
        n = 50 , left side = 5.12151488168855e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08737343222823e-1
        n = 100 , left side = 1.28083959738623e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51060559191219e-1
        n = 200 , left side = 3.20240359168444e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03996553300920e-1
        n = 500 , left side = 5.12398354990395e-6
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54986774771284e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.27760703918799e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.88411163235392e-1
        n = 20 , left side = 3.19296312784900e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.03897568409055e-1
        n = 50 , left side = 5.12152374567032e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08737342336425e-1
        n = 100 , left side = 1.28084284152674e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51060558866805e-1
        n = 200 , left side = 3.20237987470051e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03996553538090e-1
        n = 500 , left side = 5.12392899798542e-6
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54986774825836e-1


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.98204373198907e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.18023392817931e-1
        n = 20 , left side = 1.96093741108132e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.75130566418472e-2
        n = 50 , left side = 8.90320175478233e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 5.23893386894862e-2
        n = 100 , left side = 4.20399709374283e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 5.79600290625717e-2
        n = 200 , left side = 2.03292531654996e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 5.03814249531551e-2
        n = 500 , left side = 7.95946134048608e-3
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 3.67618982095097e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.08515361670426e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.95376229849795e-1
n = 20 , left side = 9.88652172815406e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.24741580468438e-1
n = 50 , left side = 6.56587485923281e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 7.57626076449814e-2
n = 100 , left side = 3.61332742512769e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 6.38667257487231e-2
n = 200 , left side = 1.88501016814133e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 5.18605764372414e-2
n = 500 , left side = 7.72268598453885e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 3.69986735654569e-2


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.16451550382340e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.99776215634498e-1
n = 20 , left side = 1.10466828745202e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.13139969004777e-1
n = 50 , left side = 4.72158292711957e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 9.42055269661138e-2
n = 100 , left side = 2.16912350736221e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 7.83087649263779e-2
n = 200 , left side = 1.03316679895289e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.03790101291259e-2
n = 500 , left side = 4.00637442698637e-3
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.07149851230094e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.05368783489744e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.45690887667864e-1
n = 20 , left side = 3.11241153770572e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.92482682372922e-1
n = 50 , left side = 3.02411171988277e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.11180239038482e-1
n = 100 , left side = 1.74104155500615e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.25895844499385e-2
n = 200 , left side = 9.25989196858301e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.14507861500717e-2
n = 500 , left side = 3.83481978962918e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.08865397603666e-2


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.99818810563318e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.86245884960506e-1
n = 20 , left side = 2.65906171704119e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.97016180579567e-1
n = 50 , left side = 7.39731951736688e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.34024036719943e-1
n = 100 , left side = 1.86935956423195e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.81306404357681e-2
n = 200 , left side = 4.67987750301657e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.02426903683531e-2
n = 500 , left side = 7.49070874981328e-5
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46464524624977e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.98513950706237e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.17713815310601e-1
n = 20 , left side = 5.12486343061099e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.72358163443869e-1
n = 50 , left side = 7.45077142524186e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33970584812068e-1
n = 100 , left side = 1.86936242723723e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.81306375727628e-2
n = 200 , left side = 4.67987750301213e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02426903683535e-2
n = 500 , left side = 7.49070874971336e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46464524624987e-2


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00168857534962e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.16058908481876e-1
n = 20 , left side = 1.13262072722325e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.10344725027654e-1
n = 50 , left side = 4.20732246994345e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.93481315378750e-2
n = 100 , left side = 2.03378378667145e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.96621621332855e-2
n = 200 , left side = 9.98779497231361e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.07228831463411e-2
n = 500 , left side = 3.95085911348814e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.07705004365077e-2
```

$$\cos(x)$$

```
n = 10 , left side = 9.93951714238188e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.16832594593019e-1
n = 20 , left side = 7.72328322774641e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.46373965472515e-1
n = 50 , left side = 3.60961128316282e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.05325243405681e-1
n = 100 , left side = 1.88410272392819e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.11589727607181e-2
n = 200 , left side = 9.61343382830915e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.10972442903456e-2
n = 500 , left side = 3.89095422715413e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.08304053228417e-2


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.13322309591825e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.02905456425013e-1
n = 20 , left side = 6.09253390188929e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.62681458731086e-1
n = 50 , left side = 2.17255059254715e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.19695850311838e-1
n = 100 , left side = 1.03403776602988e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.96596223397012e-2
n = 200 , left side = 5.03665536910625e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.56740227495485e-2
n = 500 , left side = 1.98226000171697e-3
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27390995482788e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.12663766609829e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.84961389355855e-1
n = 20 , left side = 3.44627783783419e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.89144019371637e-1
n = 50 , left side = 1.73741901387924e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.24047166098517e-1
n = 100 , left side = 9.25093740382410e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.07490625961759e-2
n = 200 , left side = 4.76419447265497e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.59464836459998e-2
n = 500 , left side = 1.93866173914381e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27826978108520e-2


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.86823828109785e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.87545383205859e-1
n = 20 , left side = 1.14200334403045e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.12186764309674e-1
n = 50 , left side = 1.90462132680702e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39516734910502e-1
n = 100 , left side = 4.76820716816984e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.95231792831830e-2
n = 200 , left side = 1.19246801639328e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05914313170154e-2
n = 500 , left side = 1.90813536953272e-5
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47022781963005e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.13589058368011e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.64868860180037e-1
n = 20 , left side = 1.19286950374290e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.11678102712550e-1
n = 50 , left side = 1.90462392585300e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39516732311457e-1
n = 100 , left side = 4.76820716817539e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.95231792831825e-2
n = 200 , left side = 1.19246801639328e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05914313170154e-2
n = 500 , left side = 1.90813536955492e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47022781963002e-2


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.14144646548721e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.02083119468117e-1
n = 20 , left side = 5.36350821680255e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.69971715581953e-1
n = 50 , left side = 2.03721764988825e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.21049179738427e-1
n = 100 , left side = 9.99650895754667e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.00034910424533e-2
n = 200 , left side = 4.95003907205904e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.57606390465957e-2
n = 500 , left side = 1.96834136039681e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27530181895990e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.63132390190498e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.39914526997788e-1
n = 20 , left side = 4.38690929008562e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.79737704849123e-1
n = 50 , left side = 1.88047305777049e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.22616625659605e-1
n = 100 , left side = 9.60447484518001e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.03955251548200e-2
n = 200 , left side = 4.85201975765448e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.58586583610003e-2
n = 500 , left side = 1.95265778643017e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27687017635656e-2
```

```
-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.18104658618466e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.54417300154991e-1
n = 20 , left side = 2.80061711992697e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.95600626550709e-1
n = 50 , left side = 1.03752156519759e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31046140585334e-1
n = 100 , left side = 5.04543144574432e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.49545685542557e-2
n = 200 , left side = 2.48679978426469e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82238783343901e-2
n = 500 , left side = 9.86054094335276e-4
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.37353054556605e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 3.35723331340524e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.82655432882786e-1
        n = 20 , left side = 2.07751849096547e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.02831612840324e-1
        n = 50 , left side = 9.21511983819834e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.32206236399111e-1
        n = 100 , left side = 4.75529632502614e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.52447036749739e-2
        n = 200 , left side = 2.41425905034909e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.82964190683057e-2
        n = 500 , left side = 9.74447265982614e-4
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.37469122840132e-2


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.23317176677876e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 3.03896048349050e-1
        n = 20 , left side = 3.19271958223943e-3
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.20414078167740e-1
        n = 50 , left side = 5.12151488168855e-4
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.40909204749141e-1
        n = 100 , left side = 1.28083959738623e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.98719160402614e-2
        n = 200 , left side = 3.20240359168444e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06786540827379e-2
        n = 500 , left side = 5.12398354990395e-6
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162355664459e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.27760703918799e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.03451695624958e-1
n = 20 , left side = 3.19296312784900e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20413834622130e-1
n = 50 , left side = 5.12152374567032e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40909203862742e-1
n = 100 , left side = 1.28084284152674e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719157158473e-2
n = 200 , left side = 3.20237987470051e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06786543199077e-2
n = 500 , left side = 5.12392899798542e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162356209978e-2


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.98204373198907e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.32185829798107e-3
n = 20 , left side = 1.96093741108132e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -7.32709384965527e-2
n = 50 , left side = 8.90320175478233e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -2.43593168900876e-2
n = 100 , left side = 4.20399709374283e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.22925388207855e-3
n = 200 , left side = 2.03292531654996e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 4.17711778147490e-3
n = 500 , left side = 7.95946134048608e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 4.94443890247824e-3
```

$$\cos(x)$$

```
        n = 10 , left side = 2.08515361670426e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.78674695329845e-1
        n = 20 , left side = 9.88652172815406e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 2.39575853300384e-2
        n = 50 , left side = 6.56587485923281e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = -9.86047934592366e-4
        n = 100 , left side = 3.61332742512769e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.67744280407285e-3
        n = 200 , left side = 1.88501016814133e-2
                1/n^(7/10) = 2.45063709469745e-2
                difference = 5.65626926556118e-3
        n = 500 , left side = 7.72268598453885e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 5.18121425842548e-3


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.16451550382340e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 8.30746811145478e-2
        n = 20 , left side = 1.10466828745202e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.23559738663771e-2
        n = 50 , left side = 4.72158292711957e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 1.74568713865400e-2
        n = 100 , left side = 2.16912350736221e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 1.81194819817276e-2
        n = 200 , left side = 1.03316679895289e-2
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.41747029574456e-2
        n = 500 , left side = 4.00637442698637e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 8.89752581597795e-3
```

$$\cos(x)$$

```
        n = 10 , left side = 7.05368783489744e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.28989353147914e-1
        n = 20 , left side = 3.11241153770572e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 9.16986872345219e-2
        n = 50 , left side = 3.02411171988277e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 3.44315834589080e-2
        n = 100 , left side = 1.74104155500615e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.24003015052882e-2
        n = 200 , left side = 9.25989196858301e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.52464789783915e-2
        n = 500 , left side = 3.83481978962918e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 9.06908045333514e-3


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.99818810563318e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.69544350440556e-1
        n = 20 , left side = 2.65906171704119e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 9.62321854411672e-2
        n = 50 , left side = 7.39731951736688e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.72753811403689e-2
        n = 100 , left side = 1.86935956423195e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.79413574911178e-2
        n = 200 , left side = 4.67987750301657e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.40383831966728e-2
        n = 500 , left side = 7.49070874981328e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28289931554662e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.98513950706237e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.01228079065110e-3
        n = 20 , left side = 5.12486343061099e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 7.15741683054691e-2
        n = 50 , left side = 7.45077142524186e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.72219292324939e-2
        n = 100 , left side = 1.86936242723723e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.79413546281125e-2
        n = 200 , left side = 4.67987750301213e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.40383831966733e-2
        n = 500 , left side = 7.49070874971336e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28289931554672e-2


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.00168857534962e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = -6.42626038073607e-4
        n = 20 , left side = 1.13262072722325e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = 9.56072988925447e-3
        n = 50 , left side = 4.20732246994345e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 2.25994759583012e-2
        n = 100 , left side = 2.03378378667145e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 1.94728791886352e-2
        n = 200 , left side = 9.98779497231361e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.45185759746609e-2
        n = 500 , left side = 3.95085911348814e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 8.95304112947619e-3
```

$$\cos(x)$$

```
        n = 10 , left side = 9.93951714238188e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.00131060073069e-1
        n = 20 , left side = 7.72328322774641e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 4.55899703341149e-2
        n = 50 , left side = 3.60961128316282e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 2.85765878261076e-2
        n = 100 , left side = 1.88410272392819e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.09696898160678e-2
        n = 200 , left side = 9.61343382830915e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.48929371186654e-2
        n = 500 , left side = 3.89095422715413e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 9.01294601581019e-3


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.13322309591825e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 8.62039219050627e-2
        n = 20 , left side = 6.09253390188929e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 6.18974635926862e-2
        n = 50 , left side = 2.17255059254715e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.29471947322642e-2
        n = 100 , left side = 1.03403776602988e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.94703393950509e-2
        n = 200 , left side = 5.03665536910625e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.94697155778683e-2
        n = 500 , left side = 1.98226000171697e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09216402412474e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 3.12663766609829e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.68259854835905e-1
        n = 20 , left side = 3.44627783783419e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 8.83600242332372e-2
        n = 50 , left side = 1.73741901387924e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.72985105189434e-2
        n = 100 , left side = 9.25093740382410e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.05597796515256e-2
        n = 200 , left side = 4.76419447265497e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.97421764743195e-2
        n = 500 , left side = 1.93866173914381e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09652385038205e-2


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 2.86823828109785e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.70843848685910e-1
        n = 20 , left side = 1.14200334403045e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.11402769171275e-1
        n = 50 , left side = 1.90462132680702e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.27680793309287e-2
        n = 100 , left side = 4.76820716816984e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.93338963385328e-2
        n = 200 , left side = 1.19246801639328e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43871241453352e-2
        n = 500 , left side = 1.90813536953272e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28848188892690e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 5.13589058368011e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.48167325660087e-1
        n = 20 , left side = 1.19286950374290e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.10894107574150e-1
        n = 50 , left side = 1.90462392585300e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.27680767318828e-2
        n = 100 , left side = 4.76820716817539e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.93338963385322e-2
        n = 200 , left side = 1.19246801639328e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43871241453352e-2
        n = 500 , left side = 1.90813536955492e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28848188892688e-2


--------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.14144646548721e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 8.53815849481670e-2
        n = 20 , left side = 5.36350821680255e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 6.91877204435536e-2
        n = 50 , left side = 2.03721764988825e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.43005241588533e-2
        n = 100 , left side = 9.99650895754667e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.98142080978031e-2
        n = 200 , left side = 4.95003907205904e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.95563318749155e-2
        n = 500 , left side = 1.96834136039681e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09355588825675e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 7.63132390190498e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.23212992477838e-1
        n = 20 , left side = 4.38690929008562e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 7.89537097107229e-2
        n = 50 , left side = 1.88047305777049e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.58679700800308e-2
        n = 100 , left side = 9.60447484518001e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.02062422101697e-2
        n = 200 , left side = 4.85201975765448e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.96543511893200e-2
        n = 500 , left side = 1.95265778643017e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.09512424565342e-2


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 6.18104658618466e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.37715765635041e-1
        n = 20 , left side = 2.80061711992697e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 9.48166314123093e-2
        n = 50 , left side = 1.03752156519759e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.42974850057599e-2
        n = 100 , left side = 5.04543144574432e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.47652856096054e-2
        n = 200 , left side = 2.48679978426469e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.20195711627098e-2
        n = 500 , left side = 9.86054094335276e-4
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.19178461486290e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 3.35723331340524e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.65953898362836e-1
        n = 20 , left side = 2.07751849096547e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.02047617701924e-1
        n = 50 , left side = 9.21511983819834e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.54575808195374e-2
        n = 100 , left side = 4.75529632502614e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.50554207303236e-2
        n = 200 , left side = 2.41425905034909e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.20921118966254e-2
        n = 500 , left side = 9.74447265982614e-4
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.19294529769817e-2


-------------------------------------------------------------------------------
x0 = 3/4*pi, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.23317176677876e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.87194513829100e-1
        n = 20 , left side = 3.19271958223943e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.19630083029340e-1
        n = 50 , left side = 5.12151488168855e-4
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.41605491695669e-2
        n = 100 , left side = 1.28083959738623e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.96826330956111e-2
        n = 200 , left side = 3.20240359168444e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44743469110577e-2
        n = 500 , left side = 5.12398354990395e-6
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28987762594144e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.27760703918799e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.86750161105008e-1
n = 20 , left side = 3.19296312784900e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.19629839483730e-1
n = 50 , left side = 5.12152374567032e-4
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.41605482831687e-2
n = 100 , left side = 1.28084284152674e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.96826327711971e-2
n = 200 , left side = 3.20237987470051e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44743471482275e-2
n = 500 , left side = 5.12392899798542e-6
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28987763139663e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [x^(1/3), x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for power in powers:
    ##########################################################
    for lamda in lamdas:  #going over each lamda value
    ##########################################################
        for q in qs:      #going over each q value
        ##########################################################
            print()
            print()
           ␣
 ↪print("-------------------------------------------------------------------------------")
```

```
            print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
           ␣
↪print("-------------------------------------------------------------------------------")
            #the activation function
            phi(x) = (1-q*(e^(-lamda*x)))/(1+q*(e^(-lamda*x)))   #formula 20.1

            #q-deformed and β-parametrized half hyperbolic tangent
            theta(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 20.8

            ##########################################################
            for i in range(len(funcs)):
            ##########################################################
                f(x)=funcs[i]
                show(f(x))
                for n in [10, 20, 50, 100, 200, 500]:
                    #def H(n, f, x):    #real-valued linear neural network␣
↪operators
                    #    return sum(f(k/n)*theta(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(theta(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                    #leftSide = abs(H(n,f,x0)-f(x0))
                    leftSide = abs(sum(f(k/n)*theta(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(theta(n*x0-k) for k in [ceil(n*a),..,floor(n*b)]) - f(x0))

                    val1 = n
                    val2 = leftSide.n()
                    val3 = 1/(n^power).n()
                    print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10 , left side = 7.33574282376017e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.27829805389671e-1
          n = 20 , left side = 4.53841801182795e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.61706351418625e-1
          n = 50 , left side = 4.74957712877522e-2
                    1/n^(3/10) = 3.09249494710992e-1
```

```
          difference = 2.61753723423239e-1
n = 100 , left side = 2.67013950556243e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.24487248095334e-1
n = 200 , left side = 1.39773905392242e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90051186797613e-1
n = 500 , left side = 5.75326859927561e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49238630155558e-1
```

x

```
n = 10 , left side = 1.48505389324612e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.86336694694811e-1
n = 20 , left side = 1.39174879467004e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.67915652069900e-1
n = 50 , left side = 1.07608816899145e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.01640677811846e-1
n = 100 , left side = 5.54452812788874e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.95743361872071e-1
n = 200 , left side = 2.77258871979472e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.76302690138890e-1
n = 500 , left side = 1.10903548889592e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.43901543865875e-1
```

x^2

```
n = 10 , left side = 1.94005188391137e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.07182045236135e-1
n = 20 , left side = 2.30868040947246e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.76222490589658e-1
n = 50 , left side = 1.38886956653740e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.70362538057252e-1
n = 100 , left side = 6.38134518553904e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.87375191295568e-1
n = 200 , left side = 2.98188925936178e-2
          1/n^(3/10) = 2.04028577336837e-1
```

```
          difference = 1.74209684743219e-1
n = 500 , left side = 1.14252357544120e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.43566663000422e-1
```

x^3

```
n = 10 , left side = 2.06175421900515e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.95011811726758e-1
n = 20 , left side = 2.53575282932135e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.53515248604770e-1
n = 50 , left side = 1.34595194359457e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.74654300351535e-1
n = 100 , left side = 5.51857590364190e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.96002884114539e-1
n = 200 , left side = 2.40653876252187e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.79963189711618e-1
n = 500 , left side = 8.82850116987996e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.46163397584954e-1
```

x^4

```
n = 10 , left side = 2.45980444406422e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.55206789220850e-1
n = 20 , left side = 2.51901006172595e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.55189525364309e-1
n = 50 , left side = 1.17335729825915e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.91913764885076e-1
n = 100 , left side = 4.25973806719297e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.08591262479028e-1
n = 200 , left side = 1.72794180717638e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.86749159265073e-1
n = 500 , left side = 6.06468552840353e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48927213226430e-1
```

$$x^{10}$$

```
n = 10 , left side = 1.88296929722229e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.12890303905044e-1
n = 20 , left side = 1.57124987034018e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.49965544502886e-1
n = 50 , left side = 3.56919049916328e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.73557589719359e-1
n = 100 , left side = 4.80555765395147e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46383085497007e-1
n = 200 , left side = 1.09199033498743e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02936587001850e-1
n = 500 , left side = 2.84658201772995e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54707240553061e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.26504552641874e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.74682680985398e-1
n = 20 , left side = 2.03548587742321e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86735672762672e-1
n = 50 , left side = 2.03304570248800e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.88919037686112e-1
n = 100 , left side = 1.26409079150098e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38547735235948e-1
n = 200 , left side = 6.81868079261294e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97209896544224e-1
n = 500 , left side = 2.84988268112463e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52142016073709e-1
```

x

```
n = 10 , left side = 8.02267409115550e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.20960492715717e-1
n = 20 , left side = 5.14929405767165e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.55597590960188e-1
n = 50 , left side = 5.36143926388598e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.55635102072132e-1
n = 100 , left side = 2.77224568458393e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23466186305119e-1
n = 200 , left side = 1.38629435986308e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90165633738206e-1
n = 500 , left side = 5.54517744447935e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446721310354e-1
```

x^2

```
n = 10 , left side = 1.28296366461717e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72890867165556e-1
n = 20 , left side = 1.38397942935223e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.68692588601681e-1
n = 50 , left side = 7.67416652503929e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.32507829460599e-1
n = 100 , left side = 3.37863631986791e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.17402279952279e-1
n = 200 , left side = 1.53794053842907e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88649171952546e-1
n = 500 , left side = 5.78781133126016e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49204087423574e-1
```

x^3

```
n = 10 , left side = 1.27831704419723e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.73355529207549e-1
n = 20 , left side = 1.61344011208260e-1
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.45746520328645e-1
n = 50 , left side = 7.78602100423141e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.31389284668678e-1
n = 100 , left side = 3.03485286276982e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.20840114523260e-1
n = 200 , left side = 1.27296398524397e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.91298937484397e-1
n = 500 , left side = 4.52652924015576e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50465369514678e-1
```

x^4

```
n = 10 , left side = 1.84494512877635e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.16692720749638e-1
n = 20 , left side = 1.66506805511951e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.40583726024953e-1
n = 50 , left side = 6.92290642748952e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.40020430436097e-1
n = 100 , left side = 2.40205845419831e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.27168058608975e-1
n = 200 , left side = 9.33054650504601e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94698030831791e-1
n = 500 , left side = 3.14415812448704e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51847740630347e-1
```

x^{10}

```
n = 10 , left side = 1.40771586828727e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.60415646798545e-1
n = 20 , left side = 1.00214745282116e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.06875786254789e-1
n = 50 , left side = 1.99853845577975e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.89264110153194e-1
n = 100 , left side = 2.75646208624215e-3
```

```
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.48432181064716e-1
        n = 200 , left side = 6.26624240120877e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03401953096716e-1
        n = 500 , left side = 1.55217235579062e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54836681519255e-1


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 2.09749541545875e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 2.91437692081397e-1
        n = 20 , left side = 7.85812770396360e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.28509254497268e-1
        n = 50 , left side = 9.34393044496805e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.99905564266024e-1
        n = 100 , left side = 1.94070471300620e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.49247938437952e-1
        n = 200 , left side = 4.71100029514671e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03557477307322e-1
        n = 500 , left side = 7.48422627483425e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54917056492085e-1
```

$$x$$

```
        n = 10 , left side = 2.08951638220122e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 2.92235595407150e-1
        n = 20 , left side = 5.25889244914822e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.54501607045422e-1
        n = 50 , left side = 1.01379455384021e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08235700157152e-1
        n = 100 , left side = 1.80708522862227e-6
                1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.51186836065729e-1
n = 200 , left side = 6.45467013171697e-12
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577330382e-1
n = 500 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 6.09251809834974e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.40262052643775e-1
n = 20 , left side = 4.57428235934711e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.61347707943433e-1
n = 50 , left side = 1.96014797649490e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.89648014946043e-1
n = 100 , left side = 5.29434230595233e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.45894300845006e-1
n = 200 , left side = 1.32428057699463e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02704296759842e-1
n = 500 , left side = 2.11884893889736e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54780013860944e-1
```

x^3

```
n = 10 , left side = 3.81659578000774e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.63021275827195e-1
n = 20 , left side = 7.43081431790645e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.32782388357840e-1
n = 50 , left side = 2.97879650699726e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79461529641019e-1
n = 100 , left side = 7.94232255998317e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43246320590975e-1
n = 200 , left side = 1.98642086856246e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02042156468275e-1
n = 500 , left side = 3.17827340834853e-4
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54674071413999e-1
```

x^4

```
n = 10 , left side = 1.25757444757586e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.75429788869686e-1
n = 20 , left side = 9.19703672747021e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.15120164262202e-1
n = 50 , left side = 3.13124123712135e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.77937082339778e-1
n = 100 , left side = 8.05935138518928e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43129291765769e-1
n = 200 , left side = 1.99376000196878e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02034817334868e-1
n = 500 , left side = 3.18015222677798e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54673883532156e-1
```

x^{10}

```
n = 10 , left side = 9.92211518367574e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.01966081790515e-1
n = 20 , left side = 5.87860822296067e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.48304449307298e-1
n = 50 , left side = 1.06402237950819e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.98609270915910e-1
n = 100 , left side = 1.39397823915505e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49794664911803e-1
n = 200 , left side = 2.58092754851807e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03770484581985e-1
n = 500 , left side = 3.78668260722235e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54954031928761e-1
```

```
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.65939350634126e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.54593298563860e-1
n = 20 , left side = 5.39175273339060e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.53173004202998e-1
n = 50 , left side = 2.66706958509519e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.82578798860040e-1
n = 100 , left side = 1.39692422376499e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37219400913308e-1
n = 200 , left side = 7.15466879542803e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96873908541409e-1
n = 500 , left side = 2.90466167844949e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52087237076384e-1
```

$$x$$

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.54226692118394e-1
n = 20 , left side = 1.28044818944893e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.79045712592011e-1
n = 50 , left side = 5.54458428059441e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53803651905048e-1
n = 100 , left side = 2.77258872001895e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23462755950768e-1
n = 200 , left side = 1.38629436111990e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90165633725638e-1
n = 500 , left side = 5.54517744447969e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446721310354e-1
```

$$x^2$$

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.57118276412179e-1
n = 20 , left side = 1.73393496362237e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.33697035174667e-1
n = 50 , left side = 6.39143140576404e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.45335180653351e-1
n = 100 , left side = 2.98438925970290e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.21344750553929e-1
n = 200 , left side = 1.43924449634690e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.89636132373368e-1
n = 500 , left side = 5.62989766084282e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49362001093991e-1
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.30655152140316e-1
n = 20 , left side = 1.75303858260733e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.31786673276172e-1
n = 50 , left side = 5.53534166881952e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53896078022797e-1
n = 100 , left side = 2.41049670707779e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.27083676080180e-1
n = 200 , left side = 1.12081526845386e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.92820424652298e-1
n = 500 , left side = 4.28703175655956e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50704866998274e-1
```

x^4

```
n = 10 , left side = 2.71811655321145e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.29375578306128e-1
n = 20 , left side = 1.59700780897926e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.47389750638979e-1
```

```
n = 50 , left side = 4.27867893894553e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.66462705321536e-1
n = 100 , left side = 1.73213915349858e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.33867251615972e-1
n = 200 , left side = 7.76000677274190e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96268570564095e-1
n = 500 , left side = 2.90182870840235e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52090070046431e-1
```

$$x^{10}$$

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.14336410295721e-1
n = 20 , left side = 6.58347789205075e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.41255752616397e-1
n = 50 , left side = 4.87085072187460e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04378643989117e-1
n = 100 , left side = 1.09970741430996e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50088935736648e-1
n = 200 , left side = 3.82804893814840e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03645772443022e-1
n = 500 , left side = 1.24276968148319e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54867621786685e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96080052578451e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.81579228369427e-1
n = 20 , left side = 2.08299179386357e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86260613598269e-1
n = 50 , left side = 1.26071386109590e-2
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96642356100033e-1
n = 100 , left side = 6.81015763376180e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44378485517196e-1
n = 200 , left side = 3.53432821873068e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00494249118106e-1
n = 500 , left side = 1.44549650366432e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53546402251169e-1
```

x

```
n = 10 , left side = 5.68097172543790e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.44377516372893e-1
n = 20 , left side = 6.32752819000140e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.43815249636890e-1
n = 50 , left side = 2.77227554082918e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81526739302700e-1
n = 100 , left side = 1.38629435997858e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37325699551172e-1
n = 200 , left side = 6.93147180559950e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097105531237e-1
n = 500 , left side = 2.77258872223984e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219310032594e-1
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.53314481216394e-1
n = 20 , left side = 9.78605569036920e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.09229974633212e-1
n = 50 , left side = 3.38868135786706e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.75362681132321e-1
n = 100 , left side = 1.54044053860311e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.35784237764927e-1
n = 200 , left side = 7.31683725369414e-3
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96711740083143e-1
n = 500 , left side = 2.83424719393494e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52157651560899e-1
```

x^3

```
n = 10 , left side = 1.73192000431425e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.27995233195847e-1
n = 20 , left side = 1.03864925521532e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.03225606015372e-1
n = 50 , left side = 3.05073733511566e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.78742121359835e-1
n = 100 , left side = 1.27681795752463e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38420463575712e-1
n = 200 , left side = 5.78399942625291e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98244577910584e-1
n = 500 , left side = 2.17239948281694e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52819499272017e-1
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.20929878931060e-1
n = 20 , left side = 9.63498090064419e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.10740722530463e-1
n = 50 , left side = 2.41914336230854e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.85058061087906e-1
n = 100 , left side = 9.37035404303933e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41818289107919e-1
n = 200 , left side = 4.05904957310239e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99969527763735e-1
n = 500 , left side = 1.47973714572884e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53512161609105e-1
```

$$x^{10}$$

```
n = 10 , left side = 1.19260700953333e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.81926532673939e-1
n = 20 , left side = 3.73465208237525e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69744010713152e-1
n = 50 , left side = 2.80162956157203e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06447865149420e-1
n = 100 , left side = 6.32905221145960e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50555737929812e-1
n = 200 , left side = 2.12043953336416e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03816533383501e-1
n = 500 , left side = 6.54808182456543e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54926417936588e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 8.10134985303517e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.20173735096921e-1
n = 20 , left side = 1.68560763315222e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90234455205382e-1
n = 50 , left side = 1.97802106438799e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07271473646604e-1
n = 100 , left side = 4.80026592954874e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50708616558003e-1
n = 200 , left side = 1.19239646471758e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909337690365e-1
n = 500 , left side = 1.90449720898211e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972853782744e-1
```

x

```
n = 10 , left side = 4.91637605442459e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.52023473083026e-1
n = 20 , left side = 3.39394250680031e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03696589030104e-1
n = 50 , left side = 1.64890433873577e-6
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09247845806653e-1
n = 100 , left side = 5.86158899196221e-12
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643145096e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 5.25230782287647e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.48664155398508e-1
n = 20 , left side = 2.83373415030338e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.78753190033871e-1
n = 50 , left side = 5.39457664221721e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03854918068775e-1
n = 100 , left side = 1.34928057788147e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49839362573077e-1
n = 200 , left side = 3.37320146703068e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03691257190134e-1
n = 500 , left side = 5.39712234723932e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54937927531361e-1
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.18963782998903e-1
n = 20 , left side = 4.36057626242193e-2
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.63484768912685e-1
n = 50 , left side = 8.09259320656261e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01156901504429e-1
n = 100 , left side = 2.02392086959322e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49164722281365e-1
n = 200 , left side = 5.05980220054464e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03522597116782e-1
n = 500 , left side = 8.09568352086454e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54910941919625e-1
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.00134260333710e-1
n = 20 , left side = 4.67481413489399e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.60342390187965e-1
n = 50 , left side = 8.21282675171929e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01036667959272e-1
n = 100 , left side = 2.03145927015683e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49157183880801e-1
n = 200 , left side = 5.06451370153246e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03522125966684e-1
n = 500 , left side = 8.09688966512401e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54910929858182e-1
```

x^{10}

```
n = 10 , left side = 7.01207124827066e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.31066521144566e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86933061112271e-1
n = 50 , left side = 1.42480124701181e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07824693463980e-1
n = 100 , left side = 2.63178146244665e-4
```

```
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50925465004713e-1
        n = 200 , left side = 6.08599933530729e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03967717343484e-1
        n = 500 , left side = 9.52678517986811e-6
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54982371969654e-1


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 5.33369660315086e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.47850267595764e-1
        n = 20 , left side = 3.23728371506256e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.74717694386279e-1
        n = 50 , left side = 1.39366391997124e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.95312855511279e-1
        n = 100 , left side = 7.14621856758935e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.44042424583369e-1
        n = 200 , left side = 3.61961230894148e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.00408965027895e-1
        n = 500 , left side = 1.45930076253697e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53532597992297e-1
```

$$x$$

```
        n = 10 , left side = 1.29071817455777e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.72115416171495e-1
        n = 20 , left side = 6.92514035886479e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.37839127948257e-1
        n = 50 , left side = 2.77258876437840e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.81523607067208e-1
        n = 100 , left side = 1.38629438314649e-2
                1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.37325699319493e-1
n = 200 , left side = 6.93147191573262e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097105421104e-1
n = 500 , left side = 2.77258876629294e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219309988541e-1
```

x^2

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.23796320108465e-1
n = 20 , left side = 8.30737213816239e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.24016810155280e-1
n = 50 , left side = 2.99438930027936e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79305601708198e-1
n = 100 , left side = 1.44174451738843e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.36771197977074e-1
n = 200 , left side = 7.07009725133728e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96958480085500e-1
n = 500 , left side = 2.79476881998980e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52197129934844e-1
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.19480393609674e-1
n = 20 , left side = 7.48642399521752e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.32226291584729e-1
n = 50 , left side = 2.42632851043291e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.84986209606663e-1
n = 100 , left side = 1.12466925545656e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.39941950596392e-1
n = 200 , left side = 5.40875852362391e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98619818813213e-1
n = 500 , left side = 2.11285351660356e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52879045238230e-1
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.33400055557578e-1
n = 20 , left side = 6.03397370785074e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.46750794458397e-1
n = 50 , left side = 1.74893080184918e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.91760186692500e-1
n = 100 , left side = 7.79966635748684e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43388976793471e-1
n = 200 , left side = 3.67816819644862e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00350409140388e-1
n = 500 , left side = 1.41984974971862e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53572049005115e-1
```

x^{10}

```
n = 10 , left side = 7.68027797084297e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.24384453918843e-1
n = 20 , left side = 9.76146773173455e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.97329063805170e-1
n = 50 , left side = 1.13068528957833e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08118809421413e-1
n = 100 , left side = 3.88474877995740e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50800168272962e-1
n = 200 , left side = 1.62038602245949e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03866538734591e-1
n = 500 , left side = 5.81892063838071e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54933709548450e-1
```

```
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96445247579275e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.81542708869345e-1
n = 20 , left side = 1.48888789279410e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.92201652608963e-1
n = 50 , left side = 6.77605354912036e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.02473441161871e-1
n = 100 , left side = 3.52568356510696e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47662959585851e-1
n = 200 , left side = 1.79801315131478e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02230564185522e-1
n = 500 , left side = 7.27768804896778e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54264129949937e-1
```

$$x$$

```
n = 10 , left side = 6.38935662496243e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37293667377648e-1
n = 20 , left side = 3.46235470985200e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72466984438384e-1
n = 50 , left side = 1.38629429714340e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95386551739558e-1
n = 100 , left side = 6.93147149063511e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44257171660323e-1
n = 200 , left side = 3.46573574531761e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00562841591519e-1
n = 500 , left side = 1.38629429812698e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53605604456707e-1
```

$$x^2$$

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.99956038458589e-1
n = 20 , left side = 4.48623512045706e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62228180332334e-1
n = 50 , left side = 1.55044047114583e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.93745089999533e-1
n = 100 , left side = 7.34183692697721e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43846806223981e-1
n = 200 , left side = 3.56832710440330e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00460250232434e-1
n = 500 , left side = 1.40270891558064e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53589189839253e-1
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.92136053485583e-1
n = 20 , left side = 4.22970110547810e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.64793520482123e-1
n = 50 , left side = 1.29223379237350e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96327156787257e-1
n = 100 , left side = 5.82201903348858e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.45366624117469e-1
n = 200 , left side = 2.75417225524133e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01274405081596e-1
n = 500 , left side = 1.06440558786375e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53927493166970e-1
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.98646348945873e-1
n = 20 , left side = 3.49981874860215e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72092344050883e-1
```

```
n = 50 , left side = 9.52960631552963e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99719888395462e-1
n = 100 , left side = 4.09764755001933e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47090995600939e-1
n = 200 , left side = 1.88876104704867e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02139816289788e-1
n = 500 , left side = 7.17895958025169e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54274002796809e-1
```

$$x^{10}$$

```
n = 10 , left side = 4.39432749437959e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.57243958683477e-1
n = 20 , left side = 5.59881198565935e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01491719551245e-1
n = 50 , left side = 6.58122885628412e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08591371825363e-1
n = 100 , left side = 2.17135216419487e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50971507934539e-1
n = 200 , left side = 8.67799400498142e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03941797396787e-1
n = 500 , left side = 3.00238003037257e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54961874954530e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245117e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.82328897802761e-1
n = 20 , left side = 3.43036193768773e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03660169599217e-1
n = 50 , left side = 5.15745217625430e-4
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08733749493366e-1
n = 100 , left side = 1.28085535782918e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060557615175e-1
n = 200 , left side = 3.19697272260777e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996607609611e-1
n = 500 , left side = 5.11285838611375e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986785896448e-1
```

x

```
n = 10 , left side = 3.03097878388942e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.98156254843383e-1
n = 20 , left side = 1.79813965208164e-5
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07072550140384e-1
n = 50 , left side = 5.04973840520506e-12
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494705942e-1
n = 100 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 3.13288100022529e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.69858423625019e-1
n = 20 , left side = 9.02981956494564e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.98060711971959e-1
n = 50 , left side = 1.44928066358063e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07800214047411e-1
n = 100 , left side = 3.62320167826058e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50826322983132e-1
n = 200 , left side = 9.05800419564451e-5
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03937997294881e-1
n = 500 , left side = 1.44928067127847e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54977405948121e-1
```

x^3

```
n = 10 , left side = 4.78600213916087e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.53327212235664e-1
n = 20 , left side = 1.35520533206202e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93538478216284e-1
n = 50 , left side = 2.17392099772526e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07075573713266e-1
n = 100 , left side = 5.43480251739198e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50645162899219e-1
n = 200 , left side = 1.35870062934806e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03892707273902e-1
n = 500 , left side = 2.17392100697045e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54970159544764e-1
```

x^4

```
n = 10 , left side = 5.14533906505906e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.49733842976682e-1
n = 20 , left side = 1.38732244570935e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93217307079811e-1
n = 50 , left side = 2.18227896612333e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07067215744868e-1
n = 100 , left side = 5.44002624822598e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50644640526135e-1
n = 200 , left side = 1.35902711252578e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03892674625584e-1
n = 500 , left side = 2.17400458665112e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54970158708967e-1
```

$$x^{10}$$

```
n = 10 , left side = 2.39574413183784e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.77229792308894e-1
n = 20 , left side = 2.97086004062650e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.04119671496278e-1
n = 50 , left side = 2.83599622557920e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08965895088434e-1
n = 100 , left side = 6.54249762593842e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51123218174699e-1
n = 200 , left side = 1.60297404173209e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04012547596420e-1
n = 500 , left side = 2.55030753033912e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54989348447303e-1
```

---

x0 = 1/2, Power = 1/2, lamda = 1/4, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 7.33574282376017e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.42870337779236e-1
n = 20 , left side = 4.53841801182795e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78222617631699e-1
n = 50 , left side = 4.74957712877522e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.39255849495573e-2
n = 100 , left side = 2.67013950556243e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.32986049443757e-2
n = 200 , left side = 1.39773905392242e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.67332875794306e-2
n = 500 , left side = 5.75326859927561e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.89680909507202e-2
```

x

```
n = 10 , left side = 1.48505389324612e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.01377227084377e-1
n = 20 , left side = 1.39174879467004e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.44319182829745e-2
n = 50 , left side = 1.07608816899145e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 3.38125393381641e-2
n = 100 , left side = 5.54452812788874e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.45547187211126e-2
n = 200 , left side = 2.77258871979472e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.29847909207075e-2
n = 500 , left side = 1.10903548889592e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.36310046610366e-2
```

x^2

```
n = 10 , left side = 1.94005188391137e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.22222577625701e-1
n = 20 , left side = 2.30868040947246e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -7.26124319726737e-3
n = 50 , left side = 1.38886956653740e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 2.53439958356949e-3
n = 100 , left side = 6.38134518553904e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 3.61865481446096e-2
n = 200 , left side = 2.98188925936178e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.08917855250369e-2
n = 500 , left side = 1.14252357544120e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.32961237955838e-2
```

x^3

```
n = 10 , left side = 2.06175421900515e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.10052344116323e-1
n = 20 , left side = 2.53575282932135e-1
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.99684851821556e-2
n = 50 , left side = 1.34595194359457e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.82616187785257e-3
n = 100 , left side = 5.51857590364190e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.48142409635810e-2
n = 200 , left side = 2.40653876252187e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.66452904934360e-2
n = 500 , left side = 8.82850116987996e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.58928583801158e-2
```

x^4

```
n = 10 , left side = 2.45980444406422e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.02473216104160e-2
n = 20 , left side = 2.51901006172595e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.82942084226162e-2
n = 50 , left side = 1.17335729825915e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 2.40856264113941e-2
n = 100 , left side = 4.25973806719297e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 5.74026193280703e-2
n = 200 , left side = 1.72794180717638e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.34312600468910e-2
n = 500 , left side = 6.06468552840353e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.86566740215923e-2
```

x^{10}

```
n = 10 , left side = 1.88296929722229e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.27930836294609e-1
n = 20 , left side = 1.57124987034018e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.64818107159607e-2
n = 50 , left side = 3.56919049916328e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.05729451245677e-1
n = 100 , left side = 4.80555765395147e-3
```

```
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.51944423460485e-2
        n = 200 , left side = 1.09199033498743e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.96186877836673e-2
        n = 500 , left side = 2.84658201772995e-4
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.44367013482228e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.26504552641874e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.89723213374964e-1
        n = 20 , left side = 2.03548587742321e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.03251938975747e-1
        n = 50 , left side = 2.03304570248800e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.21090899212429e-1
        n = 100 , left side = 1.26409079150098e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.73590920849902e-2
        n = 200 , left side = 6.81868079261294e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.38919973260418e-2
        n = 500 , left side = 2.84988268112463e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.18714768688712e-2
```

$$x$$

```
        n = 10 , left side = 8.02267409115550e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.36001025105283e-1
        n = 20 , left side = 5.14929405767165e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.72113857173262e-1
        n = 50 , left side = 5.36143926388598e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 8.78069635984497e-2
        n = 100 , left side = 2.77224568458393e-2
                1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 7.22775431541607e-2
n = 200 , left side = 1.38629435986308e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68477345200239e-2
n = 500 , left side = 5.54517744447935e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91761821055164e-2
```

x^2

```
n = 10 , left side = 1.28296366461717e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87931399555121e-1
n = 20 , left side = 1.38397942935223e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.52088548147560e-2
n = 50 , left side = 7.67416652503929e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.46796909869166e-2
n = 100 , left side = 3.37863631986791e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.62136368013209e-2
n = 200 , left side = 1.53794053842907e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.53312727343640e-2
n = 500 , left side = 5.78781133126016e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.89335482187356e-2
```

x^3

```
n = 10 , left side = 1.27831704419723e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.88396061597115e-1
n = 20 , left side = 1.61344011208260e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.22627865417192e-2
n = 50 , left side = 7.78602100423141e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.35611461949954e-2
n = 100 , left side = 3.03485286276982e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.96514713723018e-2
n = 200 , left side = 1.27296398524397e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.79810382662150e-2
n = 500 , left side = 4.52652924015576e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.01948303098400e-2
```

$$x^4$$

```
n = 10 , left side = 1.84494512877635e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.31733253139203e-1
n = 20 , left side = 1.66506805511951e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 5.70999922380279e-2
n = 50 , left side = 6.92290642748952e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.21922919624143e-2
n = 100 , left side = 2.40205845419831e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.59794154580169e-2
n = 200 , left side = 9.33054650504601e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.13801316136087e-2
n = 500 , left side = 3.14415812448704e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.15772014255088e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.40771586828727e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.75456179188111e-1
n = 20 , left side = 1.00214745282116e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.23392052467863e-1
n = 50 , left side = 1.99853845577975e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21435971679512e-1
n = 100 , left side = 2.75646208624215e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.72435379137579e-2
n = 200 , left side = 6.26624240120877e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.00840538785339e-2
n = 500 , left side = 1.55217235579062e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45661423144167e-2
```

```
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.09749541545875e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.06478224470963e-1
n = 20 , left side = 7.85812770396360e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.45025520710343e-1
n = 50 , left side = 9.34393044496805e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.32077425792341e-1
n = 100 , left side = 1.94070471300620e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.80592952869938e-2
n = 200 , left side = 4.71100029514671e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02395780891401e-2
n = 500 , left side = 7.48422627483425e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46465172872475e-2
```

$$x$$

```
n = 10 , left side = 2.08951638220122e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.07276127796716e-1
n = 20 , left side = 5.25889244914822e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.71017873258497e-1
n = 50 , left side = 1.01379455384021e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40407561683469e-1
n = 100 , left side = 1.80708522862227e-6
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99981929147714e-2
n = 200 , left side = 6.45467013171697e-12
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781122001e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

$$x^2$$

```
n = 10 , left side = 6.09251809834974e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.55302585033341e-1
n = 20 , left side = 4.57428235934711e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.77863974156508e-1
n = 50 , left side = 1.96014797649490e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21819876472361e-1
n = 100 , left side = 5.29434230595233e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.47056576940477e-2
n = 200 , left side = 1.32428057699463e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.93863975416601e-2
n = 500 , left side = 2.11884893889736e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45094746561061e-2
```

x^3

```
n = 10 , left side = 3.81659578000774e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.78061808216761e-1
n = 20 , left side = 7.43081431790645e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.49298654570914e-1
n = 50 , left side = 2.97879650699726e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11633391167337e-1
n = 100 , left side = 7.94232255998317e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.20576774400168e-2
n = 200 , left side = 1.98642086856246e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.87242572500923e-2
n = 500 , left side = 3.17827340834853e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44035322091609e-2
```

x^4

```
n = 10 , left side = 1.25757444757586e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.90470321259252e-1
n = 20 , left side = 9.19703672747021e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.31636430475277e-1
```

```
n = 50 , left side = 3.13124123712135e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.10108943866096e-1
n = 100 , left side = 8.05935138518928e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.19406486148107e-2
n = 200 , left side = 1.99376000196878e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.87169181166860e-2
n = 500 , left side = 3.18015222677798e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44033443273180e-2
```

$$x^{10}$$

```
n = 10 , left side = 9.92211518367574e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.17006614180081e-1
n = 20 , left side = 5.87860822296067e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.64820715520372e-1
n = 50 , left side = 1.06402237950819e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.30781132442228e-1
n = 100 , left side = 1.39397823915505e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.86060217608450e-2
n = 200 , left side = 2.58092754851807e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04525853638029e-2
n = 500 , left side = 3.78668260722235e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46834927239236e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.65939350634126e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.69633830953425e-1
n = 20 , left side = 5.39175273339060e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.69689270416073e-1
n = 50 , left side = 2.66706958509519e-2
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.14750660386358e-1
n = 100 , left side = 1.39692422376499e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.60307577623501e-2
n = 200 , left side = 7.15466879542803e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.35560093232267e-2
n = 500 , left side = 2.90466167844949e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18166978715463e-2
```

x

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.69267224507960e-1
n = 20 , left side = 1.28044818944893e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 9.55619788050857e-2
n = 50 , left side = 5.54458428059441e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.59755134313654e-2
n = 100 , left side = 2.77258872001895e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.22741127998105e-2
n = 200 , left side = 1.38629436111990e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68477345074558e-2
n = 500 , left side = 5.54517744447969e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91761821055161e-2
```

x^2

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.21588088017442e-2
n = 20 , left side = 1.73393496362237e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 5.02133013877419e-2
n = 50 , left side = 6.39143140576404e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.75070421796691e-2
n = 100 , left side = 2.98438925970290e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.01561074029710e-2
n = 200 , left side = 1.43924449634690e-2
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.63182331551857e-2
n = 500 , left side = 5.62989766084282e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.90914618891530e-2
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.56956845298820e-2
n = 20 , left side = 1.75303858260733e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 4.83029394892462e-2
n = 50 , left side = 5.53534166881952e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.60679395491143e-2
n = 100 , left side = 2.41049670707779e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.58950329292221e-2
n = 200 , left side = 1.12081526845386e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.95025254341161e-2
n = 500 , left side = 4.28703175655956e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.04343277934362e-2
```

x^4

```
n = 10 , left side = 2.71811655321145e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.44161106956934e-2
n = 20 , left side = 1.59700780897926e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.39060168520533e-2
n = 50 , left side = 4.27867893894553e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.86345668478542e-2
n = 100 , left side = 1.73213915349858e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.26786084650142e-2
n = 200 , left side = 7.76000677274190e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.29506713459129e-2
n = 500 , left side = 2.90182870840235e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18195308415934e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.29376942685286e-1
n = 20 , left side = 6.58347789205075e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.57772018829471e-1
n = 50 , left side = 4.87085072187460e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36550505515435e-1
n = 100 , left side = 1.09970741430996e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.89002925856901e-2
n = 200 , left side = 3.82804893814840e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03278732248399e-2
n = 500 , left side = 1.24276968148319e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45970825818475e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96080052578451e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96619760758993e-1
n = 20 , left side = 2.08299179386357e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.02776879811343e-1
n = 50 , left side = 1.26071386109590e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28814217626351e-1
n = 100 , left side = 6.81015763376180e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.31898423662382e-2
n = 200 , left side = 3.53432821873068e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.71763498999241e-2
n = 500 , left side = 1.44549650366432e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32758630463315e-2
```

x

```
n = 10 , left side = 5.68097172543790e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.59418048762459e-1
n = 20 , left side = 6.32752819000140e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.60331515849965e-1
n = 50 , left side = 2.77227554082918e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13698600829018e-1
n = 100 , left side = 1.38629435997858e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61370564002142e-2
n = 200 , left side = 6.93147180559950e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37792063130553e-2
n = 500 , left side = 2.77258872223984e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487708277560e-2
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.68355013605960e-1
n = 20 , left side = 9.78605569036920e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.25746240846287e-1
n = 50 , left side = 3.38868135786706e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.07534542658639e-1
n = 100 , left side = 1.54044053860311e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.45955946139690e-2
n = 200 , left side = 7.31683725369414e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.33938408649606e-2
n = 500 , left side = 2.83424719393494e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18871123560609e-2
```

x^3

```
n = 10 , left side = 1.73192000431425e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.43035765585412e-1
n = 20 , left side = 1.03864925521532e-1
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.19741872228447e-1
n = 50 , left side = 3.05073733511566e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.10913982886153e-1
n = 100 , left side = 1.27681795752463e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.72318204247537e-2
n = 200 , left side = 5.78399942625291e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.49266786924018e-2
n = 500 , left side = 2.17239948281694e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.25489600671788e-2
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.35970411320625e-1
n = 20 , left side = 9.63498090064419e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.27256988743537e-1
n = 50 , left side = 2.41914336230854e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.17229922614224e-1
n = 100 , left side = 9.37035404303933e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.06296459569607e-2
n = 200 , left side = 4.05904957310239e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.66516285455524e-2
n = 500 , left side = 1.47973714572884e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32416224042670e-2
```

x^{10}

```
n = 10 , left side = 1.19260700953333e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.96967065063505e-1
n = 20 , left side = 3.73465208237525e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.86260276926226e-1
n = 50 , left side = 2.80162956157203e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38619726675737e-1
n = 100 , left side = 6.32905221145960e-4
```

```
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.93670947788540e-2
        n = 200 , left side = 2.12043953336416e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.04986341653183e-2
        n = 500 , left side = 6.54808182456543e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46558787317501e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 8.10134985303517e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.35214267486486e-1
        n = 20 , left side = 1.68560763315222e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.06750721418457e-1
        n = 50 , left side = 1.97802106438799e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39443335172922e-1
        n = 100 , left side = 4.80026592954874e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.95199734070451e-2
        n = 200 , left side = 1.19239646471758e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05914384721830e-2
        n = 500 , left side = 1.90449720898211e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47023145779060e-2
```

$$x$$

```
        n = 10 , left side = 4.91637605442459e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.67064005472592e-1
        n = 20 , left side = 3.39394250680031e-3
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.20212855243179e-1
        n = 50 , left side = 1.64890433873577e-6
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.41419707332971e-1
        n = 100 , left side = 5.86158899196221e-12
                1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 9.99999999941384e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

x^2

```
n = 10 , left side = 5.25230782287647e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.63704687788073e-1
n = 20 , left side = 2.83373415030338e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.95269456246945e-1
n = 50 , left side = 5.39457664221721e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36026779595092e-1
n = 100 , left side = 1.34928057788147e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.86507194221185e-2
n = 200 , left side = 3.37320146703068e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03733579719517e-2
n = 500 , left side = 5.39712234723932e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46673883265234e-2
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.34004315388468e-1
n = 20 , left side = 4.36057626242193e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.80001035125760e-1
n = 50 , left side = 8.09259320656261e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33328763030747e-1
n = 100 , left side = 2.02392086959322e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.79760791304068e-2
n = 200 , left side = 5.05980220054464e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02046978986003e-2
n = 500 , left side = 8.09568352086454e-5
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46404027147871e-2
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.15174792723276e-1
n = 20 , left side = 4.67481413489399e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.76858656401039e-1
n = 50 , left side = 8.21282675171929e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33208529485590e-1
n = 100 , left side = 2.03145927015683e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.79685407298432e-2
n = 200 , left side = 5.06451370153246e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02042267485015e-2
n = 500 , left side = 8.09688966512401e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46403906533446e-2
```

x^{10}

```
n = 10 , left side = 7.01207124827066e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.46107053534131e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.03449327325345e-1
n = 50 , left side = 1.42480124701181e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39996554990298e-1
n = 100 , left side = 2.63178146244665e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97368218537553e-2
n = 200 , left side = 6.08599933530729e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06498181253017e-2
n = 500 , left side = 9.52678517986811e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47118327648159e-2
```

```
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.33369660315086e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.62890799985329e-1
n = 20 , left side = 3.23728371506256e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.91233960599353e-1
n = 50 , left side = 1.39366391997124e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27484717037597e-1
n = 100 , left side = 7.14621856758935e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.28537814324107e-2
n = 200 , left side = 3.61961230894148e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.70910658097133e-2
n = 500 , left side = 1.45930076253697e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32620587874588e-2
```

$$x$$

```
n = 10 , left side = 1.29071817455777e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87155948561061e-1
n = 20 , left side = 6.92514035886479e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.54355394161331e-1
n = 50 , left side = 2.77258876437840e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13695468593525e-1
n = 100 , left side = 1.38629438314649e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61370561685351e-2
n = 200 , left side = 6.93147191573262e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37792062029221e-2
n = 500 , left side = 2.77258876629294e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487707837029e-2
```

$$x^2$$

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.38836852498031e-1
n = 20 , left side = 8.30737213816239e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.40533076368355e-1
n = 50 , left side = 2.99438930027936e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11477463234516e-1
n = 100 , left side = 1.44174451738843e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.55825548261157e-2
n = 200 , left side = 7.07009725133728e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.36405808673175e-2
n = 500 , left side = 2.79476881998980e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19265907300060e-2
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.34520925999240e-1
n = 20 , left side = 7.48642399521752e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.48742557797804e-1
n = 50 , left side = 2.42632851043291e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.17158071132980e-1
n = 100 , left side = 1.12466925545656e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.87533074454344e-2
n = 200 , left side = 5.40875852362391e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.53019195950308e-2
n = 500 , left side = 2.11285351660356e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.26085060333922e-2
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.48440587947144e-1
n = 20 , left side = 6.03397370785074e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.63267060671472e-1
```

```
n = 50 , left side = 1.74893080184918e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.23932048218818e-1
n = 100 , left side = 7.79966635748684e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.22003336425132e-2
n = 200 , left side = 3.67816819644862e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.70325099222061e-2
n = 500 , left side = 1.41984974971862e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33015098002772e-2
```

x^{10}

```
n = 10 , left side = 7.68027797084297e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.39424986308408e-1
n = 20 , left side = 9.76146773173455e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.13845330018244e-1
n = 50 , left side = 1.13068528957833e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40290670947731e-1
n = 100 , left side = 3.88474877995740e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96115251220043e-2
n = 200 , left side = 1.62038602245949e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05486395164088e-2
n = 500 , left side = 5.81892063838071e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46631703436120e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$x^{\frac{1}{3}}$

```
n = 10 , left side = 1.96445247579275e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96583241258910e-1
n = 20 , left side = 1.48888789279410e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.08717918822038e-1
n = 50 , left side = 6.77605354912036e-3
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34645302688189e-1
n = 100 , left side = 3.52568356510696e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.64743164348930e-2
n = 200 , left side = 1.79801315131478e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.89126649673400e-2
n = 500 , left side = 7.27768804896778e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.39935907450990e-2
```

x

```
n = 10 , left side = 6.38935662496243e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52334199767214e-1
n = 20 , left side = 3.46235470985200e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88983250651459e-1
n = 50 , left side = 1.38629429714340e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27558413265876e-1
n = 100 , left side = 6.93147149063511e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30685285093649e-2
n = 200 , left side = 3.46573574531761e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72449423733371e-2
n = 500 , left side = 1.38629429812698e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33350652518688e-2
```

x^2

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.14996570848155e-1
n = 20 , left side = 4.48623512045706e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78744446545408e-1
n = 50 , left side = 1.55044047114583e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.25916951525851e-1
n = 100 , left side = 7.34183692697721e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.26581630730228e-2
n = 200 , left side = 3.56832710440330e-3
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.71423510142515e-2
n = 500 , left side = 1.40270891558064e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33186506344152e-2
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.07176585875148e-1
n = 20 , left side = 4.22970110547810e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.81309786695198e-1
n = 50 , left side = 1.29223379237350e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28499018313574e-1
n = 100 , left side = 5.82201903348858e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.41779809665114e-2
n = 200 , left side = 2.75417225524133e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.79565058634134e-2
n = 500 , left side = 1.06440558786375e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.36569539621320e-2
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.13686881335438e-1
n = 20 , left side = 3.49981874860215e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88608610263957e-1
n = 50 , left side = 9.52960631552963e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31891749921780e-1
n = 100 , left side = 4.09764755001933e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.59023524499807e-2
n = 200 , left side = 1.88876104704867e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.88219170716061e-2
n = 500 , left side = 7.17895958025169e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40034635919706e-2
```

$$x^{10}$$

```
n = 10 , left side = 4.39432749437959e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.72284491073042e-1
n = 20 , left side = 5.59881198565935e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.18007985764320e-1
n = 50 , left side = 6.58122885628412e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40763233351681e-1
n = 100 , left side = 2.17135216419487e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97828647835805e-2
n = 200 , left side = 8.67799400498142e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06238981786049e-2
n = 500 , left side = 3.00238003037257e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46913357496921e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245117e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.97369430192326e-1
n = 20 , left side = 3.43036193768773e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20176435812291e-1
n = 50 , left side = 5.15745217625430e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40905611019684e-1
n = 100 , left side = 1.28085535782918e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719144642171e-2
n = 200 , left side = 3.19697272260777e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06787083914287e-2
n = 500 , left side = 5.11285838611375e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162466916097e-2
```

x

```
n = 10 , left side = 3.03097878388942e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.13196787232949e-1
n = 20 , left side = 1.79813965208164e-5
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23588816353458e-1
n = 50 , left side = 5.04973840520506e-12
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356232260e-1
n = 100 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

x^2

```
n = 10 , left side = 3.13288100022529e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.84898956014585e-1
n = 20 , left side = 9.02981956494564e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.14576978185033e-1
n = 50 , left side = 1.44928066358063e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39972075573729e-1
n = 100 , left side = 3.62320167826058e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96376798321739e-2
n = 200 , left side = 9.05800419564451e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06200980766983e-2
n = 500 , left side = 1.44928067127847e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47068667432830e-2
```

x^3

```
n = 10 , left side = 4.78600213916087e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.68367744625229e-1
n = 20 , left side = 1.35520533206202e-2
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.10054744429359e-1
n = 50 , left side = 2.17392099772526e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39247435239584e-1
n = 100 , left side = 5.43480251739198e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94565197482608e-2
n = 200 , left side = 1.35870062934806e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05748080557199e-2
n = 500 , left side = 2.17392100697045e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46996203399261e-2
```

x^4

```
n = 10 , left side = 5.14533906505906e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.64774375366247e-1
n = 20 , left side = 1.38732244570935e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.09733573292885e-1
n = 50 , left side = 2.18227896612333e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39239077271186e-1
n = 100 , left side = 5.44002624822598e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94559973751774e-2
n = 200 , left side = 1.35902711252578e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05747754074022e-2
n = 500 , left side = 2.17400458665112e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46996195041293e-2
```

x^{10}

```
n = 10 , left side = 2.39574413183784e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.92270324698460e-1
n = 20 , left side = 2.97086004062650e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20635937709352e-1
n = 50 , left side = 2.83599622557920e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41137756614752e-1
n = 100 , left side = 6.54249762593842e-5
```

```
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.99345750237406e-2
        n = 200 , left side = 1.60297404173209e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06946483782374e-2
        n = 500 , left side = 2.55030753033912e-6
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47188092424655e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 7.33574282376017e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.26168803259286e-1
        n = 20 , left side = 4.53841801182795e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 7.74386224932996e-2
        n = 50 , left side = 4.74957712877522e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 1.71769293699835e-2
        n = 100 , left side = 2.67013950556243e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 1.31093219997254e-2
        n = 200 , left side = 1.39773905392242e-2
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.05289804077503e-2
        n = 500 , left side = 5.75326859927561e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 7.15063164368872e-3
```

$$x$$

```
        n = 10 , left side = 1.48505389324612e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.84675692564427e-1
        n = 20 , left side = 1.39174879467004e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = -1.63520768554254e-2
        n = 50 , left side = 1.07608816899145e-1
                1/n^(7/10) = 6.46727006577358e-2
                difference = -4.29361162414096e-2
        n = 100 , left side = 5.54452812788874e-2
                1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = -1.56345642235376e-2
n = 200 , left side = 2.77258871979472e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -3.21951625097272e-3
n = 500 , left side = 1.10903548889592e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.81354535400517e-3
```

x^2

```
n = 10 , left side = 1.94005188391137e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.52104310575066e-3
n = 20 , left side = 2.30868040947246e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.08045238335667e-1
n = 50 , left side = 1.38886956653740e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -7.42142559960043e-2
n = 100 , left side = 6.38134518553904e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.40027348000407e-2
n = 200 , left side = 2.98188925936178e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -5.31252164664331e-3
n = 500 , left side = 1.14252357544120e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.47866448855231e-3
```

x^3

```
n = 10 , left side = 2.06175421900515e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -6.64919040362652e-3
n = 20 , left side = 2.53575282932135e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.30752480320556e-1
n = 50 , left side = 1.34595194359457e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -6.99224937017212e-2
n = 100 , left side = 5.51857590364190e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -1.53750419810693e-2
n = 200 , left side = 2.40653876252187e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 4.40983321755770e-4
n = 500 , left side = 8.82850116987996e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 4.07539907308436e-3
```

$$x^4$$

```
n = 10 , left side = 2.45980444406422e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.64542129095339e-2
n = 20 , left side = 2.51901006172595e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.29078203561016e-1
n = 50 , left side = 1.17335729825915e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -5.26630291681797e-2
n = 100 , left side = 4.25973806719297e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.78666361657996e-3
n = 200 , left side = 1.72794180717638e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 7.22695287521072e-3
n = 500 , left side = 6.06468552840353e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.83921471456079e-3
```

$$x^{10}$$

```
n = 10 , left side = 1.88296929722229e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.12293017746595e-2
n = 20 , left side = 1.57124987034018e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.43021844224393e-2
n = 50 , left side = 3.56919049916328e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.89807956661030e-2
n = 100 , left side = 4.80555765395147e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.50051594013983e-2
n = 200 , left side = 1.09199033498743e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.34143806119871e-2
n = 500 , left side = 2.84658201772995e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.26192420411913e-2
```

```
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.26504552641874e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.30216788550137e-2
n = 20 , left side = 2.03548587742321e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02467943837347e-1
n = 50 , left side = 2.03304570248800e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.43422436328557e-2
n = 100 , left side = 1.26409079150098e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.71698091403399e-2
n = 200 , left side = 6.81868079261294e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.76876901543616e-2
n = 500 , left side = 2.84988268112463e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.00540175618397e-2
```

$$x$$

```
n = 10 , left side = 8.02267409115550e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.19299490585333e-1
n = 20 , left side = 5.14929405767165e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.13298620348626e-2
n = 50 , left side = 5.36143926388598e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.10583080188759e-2
n = 100 , left side = 2.77224568458393e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.20882602095104e-2
n = 200 , left side = 1.38629435986308e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06434273483437e-2
n = 500 , left side = 5.54517744447935e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35872279848497e-3
```

$$x^2$$

```
n = 10 , left side = 1.28296366461717e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.12298650351712e-2
n = 20 , left side = 1.38397942935223e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.55751403236440e-2
n = 50 , left side = 7.67416652503929e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.20689645926572e-2
n = 100 , left side = 3.37863631986791e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 6.02435385667062e-3
n = 200 , left side = 1.53794053842907e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 9.12696556268378e-3
n = 500 , left side = 5.78781133126016e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.11608891170416e-3
```

x^3

```
n = 10 , left side = 1.27831704419723e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.16945270771649e-2
n = 20 , left side = 1.61344011208260e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.85212085966808e-2
n = 50 , left side = 7.78602100423141e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.31875093845784e-2
n = 100 , left side = 3.03485286276982e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.46218842765152e-3
n = 200 , left side = 1.27296398524397e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.17767310945348e-2
n = 500 , left side = 4.52652924015576e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.37737100280857e-3
```

x^4

```
n = 10 , left side = 1.84494512877635e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.50317186192532e-2
n = 20 , left side = 1.66506805511951e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -4.36840029003720e-2
```

```
n = 50 , left side = 6.92290642748952e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -4.55636361715944e-3
n = 100 , left side = 2.40205845419831e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.57901325133667e-2
n = 200 , left side = 9.33054650504601e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.51758244419285e-2
n = 500 , left side = 3.14415812448704e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.75974211847728e-3
```

$$x^{10}$$

```
n = 10 , left side = 1.40771586828727e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.87546446681609e-2
n = 20 , left side = 1.00214745282116e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.26080573294634e-2
n = 50 , left side = 1.99853845577975e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.46873160999382e-2
n = 100 , left side = 2.75646208624215e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.70542549691076e-2
n = 200 , left side = 6.26624240120877e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.38797467068536e-2
n = 500 , left side = 1.55217235579062e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27486830073853e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.09749541545875e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.02233100489870e-2
n = 20 , left side = 7.85812770396360e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.42415255719431e-2
n = 50 , left side = 9.34393044496805e-3
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.53287702127677e-2
n = 100 , left side = 1.94070471300620e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.78700123423435e-2
n = 200 , left side = 4.71100029514671e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40352709174598e-2
n = 500 , left side = 7.48422627483425e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28290579802160e-2
```

x

```
n = 10 , left side = 2.08951638220122e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -9.42540672323408e-3
n = 20 , left side = 5.25889244914822e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.02338781200969e-2
n = 50 , left side = 1.01379455384021e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.36589061038955e-2
n = 100 , left side = 1.80708522862227e-6
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98089099701211e-2
n = 200 , left side = 6.45467013171697e-12
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709405198e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 6.09251809834974e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.38601050513391e-1
n = 20 , left side = 4.57428235934711e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.70799790181080e-2
n = 50 , left side = 1.96014797649490e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.50712208927868e-2
n = 100 , left side = 5.29434230595233e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.45163747493974e-2
n = 200 , left side = 1.32428057699463e-3
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.31820903699799e-2
n = 500 , left side = 2.11884893889736e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.26920153490746e-2
```

x^3

```
n = 10 , left side = 3.81659578000774e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.61360273696811e-1
n = 20 , left side = 7.43081431790645e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.85146594325146e-2
n = 50 , left side = 2.97879650699726e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.48847355877632e-2
n = 100 , left side = 7.94232255998317e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.18683944953666e-2
n = 200 , left side = 1.98642086856246e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.25199500784120e-2
n = 500 , left side = 3.17827340834853e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25860729021295e-2
```

x^4

```
n = 10 , left side = 1.25757444757586e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.37687867393017e-2
n = 20 , left side = 9.19703672747021e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.08524353368769e-2
n = 50 , left side = 3.13124123712135e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.33602882865223e-2
n = 100 , left side = 8.05935138518928e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.17513656701605e-2
n = 200 , left side = 1.99376000196878e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.25126109450057e-2
n = 500 , left side = 3.18015222677798e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25858850202865e-2
```

$$x^{10}$$

```
n = 10 , left side = 9.92211518367574e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.00305079660131e-1
n = 20 , left side = 5.87860822296067e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.40367203819724e-2
n = 50 , left side = 1.06402237950819e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.40324768626539e-2
n = 100 , left side = 1.39397823915505e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.84167388161947e-2
n = 200 , left side = 2.58092754851807e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42482781921227e-2
n = 500 , left side = 3.78668260722235e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28660334168921e-2
```

---

x0 = 1/2, Power = 7/10, lamda = 1/2, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.65939350634126e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.52932296433475e-1
n = 20 , left side = 5.39175273339060e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.89052752776731e-2
n = 50 , left side = 2.66706958509519e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.80020048067839e-2
n = 100 , left side = 1.39692422376499e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.58414748176998e-2
n = 200 , left side = 7.15466879542803e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.73517021515465e-2
n = 500 , left side = 2.90466167844949e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.99923856451483e-3
```

x

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.25656899880097e-2
n = 20 , left side = 1.28044818944893e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.22201633331423e-3
n = 50 , left side = 5.54458428059441e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.22685785179164e-3
n = 100 , left side = 2.77258872001895e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.20848298551602e-2
n = 200 , left side = 1.38629436111990e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06434273357755e-2
n = 500 , left side = 5.54517744447969e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35872279848464e-3
```

x^2

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.45427257182058e-2
n = 20 , left side = 1.73393496362237e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.05706937506581e-2
n = 50 , left side = 6.39143140576404e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 7.58386600095390e-4
n = 100 , left side = 2.98438925970290e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.96682445832077e-3
n = 200 , left side = 1.43924449634690e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.01139259835055e-2
n = 500 , left side = 5.62989766084282e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.27400258212150e-3
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.10058499900679e-2
n = 20 , left side = 1.75303858260733e-1
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.24810556491538e-2
n = 50 , left side = 5.53534166881952e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.31928396954054e-3
n = 100 , left side = 2.41049670707779e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.57057499845718e-2
n = 200 , left side = 1.12081526845386e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.32982182624359e-2
n = 500 , left side = 4.28703175655956e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.61686848640476e-3
```

x^4

```
n = 10 , left side = 2.71811655321145e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.22854238242565e-2
n = 20 , left side = 1.59700780897926e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.68779782863466e-2
n = 50 , left side = 4.27867893894553e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.18859112682804e-2
n = 100 , left side = 1.73213915349858e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.24893255203640e-2
n = 200 , left side = 7.76000677274190e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.67463641742326e-2
n = 500 , left side = 2.90182870840235e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.00020715345620e-2
```

x^{10}

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.26754081653363e-2
n = 20 , left side = 6.58347789205075e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.69880236910715e-2
n = 50 , left side = 4.87085072187460e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.98018499358612e-2
n = 100 , left side = 1.09970741430996e-3
```

```
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.87110096410398e-2
        n = 200 , left side = 3.82804893814840e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.41235660531597e-2
        n = 500 , left side = 1.24276968148319e-4
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.27796232748160e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.96080052578451e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.79918226239043e-1
        n = 20 , left side = 2.08299179386357e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.01992884672943e-1
        n = 50 , left side = 1.26071386109590e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.20655620467768e-2
        n = 100 , left side = 6.81015763376180e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.30005594215879e-2
        n = 200 , left side = 3.53432821873068e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.09720427282438e-2
        n = 500 , left side = 1.44549650366432e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.14584037393000e-2
```

$$x$$

```
        n = 10 , left side = 5.68097172543790e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.42716514242509e-1
        n = 20 , left side = 6.32752819000140e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 5.95475207115651e-2
        n = 50 , left side = 2.77227554082918e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 3.69499452494439e-2
        n = 100 , left side = 1.38629435997858e-2
                1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 2.59477734555639e-2
n = 200 , left side = 6.93147180559950e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75748991413750e-2
n = 500 , left side = 2.77258872223984e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313115207245e-2
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.16534790860097e-2
n = 20 , left side = 9.78605569036920e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.49622457078870e-2
n = 50 , left side = 3.38868135786706e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.07858870790652e-2
n = 100 , left side = 1.54044053860311e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.44063116693187e-2
n = 200 , left side = 7.31683725369414e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.71895336932804e-2
n = 500 , left side = 2.83424719393494e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.00696530490294e-2
```

x^3

```
n = 10 , left side = 1.73192000431425e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.63342310654625e-2
n = 20 , left side = 1.03864925521532e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.89578770900470e-2
n = 50 , left side = 3.05073733511566e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.41653273065791e-2
n = 100 , left side = 1.27681795752463e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.70425374801034e-2
n = 200 , left side = 5.78399942625291e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.87223715207216e-2
n = 500 , left side = 2.17239948281694e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07315007601474e-2
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.92688768006752e-2
n = 20 , left side = 9.63498090064419e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.64729936051372e-2
n = 50 , left side = 2.41914336230854e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.04812670346504e-2
n = 100 , left side = 9.37035404303933e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.04403630123104e-2
n = 200 , left side = 4.05904957310239e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.04473213738721e-2
n = 500 , left side = 1.47973714572884e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14241630972355e-2
```

x^{10}

```
n = 10 , left side = 1.19260700953333e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.02655305435546e-2
n = 20 , left side = 3.73465208237525e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.54762817878265e-2
n = 50 , left side = 2.80162956157203e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.18710710961637e-2
n = 100 , left side = 6.32905221145960e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.91778118342038e-2
n = 200 , left side = 2.12043953336416e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42943269936381e-2
n = 500 , left side = 6.54808182456543e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28384194247187e-2
```

```
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 8.10134985303517e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.18512732966536e-1
n = 20 , left side = 1.68560763315222e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.05966726280057e-1
n = 50 , left side = 1.97802106438799e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.26946795933478e-2
n = 100 , left side = 4.80026592954874e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93306904623949e-2
n = 200 , left side = 1.19239646471758e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43871313005027e-2
n = 500 , left side = 1.90449720898211e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848552708745e-2
```

$$x$$

```
n = 10 , left side = 4.91637605442459e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.50362470952642e-1
n = 20 , left side = 3.39394250680031e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19428860104779e-1
n = 50 , left side = 1.64890433873577e-6
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46710517533970e-2
n = 100 , left side = 5.86158899196221e-12
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170494881e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

$$x^2$$

```
n = 10 , left side = 5.25230782287647e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.47003153268123e-1
n = 20 , left side = 2.83373415030338e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.44854611085452e-2
n = 50 , left side = 5.39457664221721e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.92781240155185e-2
n = 100 , left side = 1.34928057788147e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.84614364774683e-2
n = 200 , left side = 3.37320146703068e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41690508002714e-2
n = 500 , left side = 5.39712234723932e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28499290194919e-2
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.17302780868518e-1
n = 20 , left side = 4.36057626242193e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.92170399873597e-2
n = 50 , left side = 8.09259320656261e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.65801074511731e-2
n = 100 , left side = 2.02392086959322e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.77867961857565e-2
n = 200 , left side = 5.05980220054464e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40003907269200e-2
n = 500 , left side = 8.09568352086454e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28229434077557e-2
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.84732582033261e-2
n = 20 , left side = 4.67481413489399e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.60746612626391e-2
```

```
n = 50 , left side = 8.21282675171929e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.64598739060165e-2
n = 100 , left side = 2.03145927015683e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.77792577851929e-2
n = 200 , left side = 5.06451370153246e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39999195768213e-2
n = 500 , left side = 8.09688966512401e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28229313463131e-2
```

$$x^{10}$$

```
n = 10 , left side = 7.01207124827066e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.29405519014181e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02665332186945e-1
n = 50 , left side = 1.42480124701181e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.32478994107240e-2
n = 100 , left side = 2.63178146244665e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95475389091051e-2
n = 200 , left side = 6.08599933530729e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44455109536214e-2
n = 500 , left side = 9.52678517986811e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28943734577845e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.33369660315086e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.46189265465379e-1
n = 20 , left side = 3.23728371506256e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.04499654609535e-2
n = 50 , left side = 1.39366391997124e-2
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.07360614580233e-2
n = 100 , left side = 7.14621856758935e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.26644984877604e-2
n = 200 , left side = 3.61961230894148e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.08867586380330e-2
n = 500 , left side = 1.45930076253697e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14445994804273e-2
```

x

```
n = 10 , left side = 1.29071817455777e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.04544140411110e-2
n = 20 , left side = 6.92514035886479e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.35713990229311e-2
n = 50 , left side = 2.77258876437840e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69468130139517e-2
n = 100 , left side = 1.38629438314649e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59477732238848e-2
n = 200 , left side = 6.93147191573262e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75748990312419e-2
n = 500 , left side = 2.77258876629294e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313114766714e-2
```

x^2

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.21353179780807e-2
n = 20 , left side = 8.30737213816239e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.97490812299551e-2
n = 50 , left side = 2.99438930027936e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.47288076549422e-2
n = 100 , left side = 1.44174451738843e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.53932718814655e-2
n = 200 , left side = 7.07009725133728e-3
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.74362736956372e-2
n = 500 , left side = 2.79476881998980e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01091314229745e-2
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.78193914792899e-2
n = 20 , left side = 7.48642399521752e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.79585626594039e-2
n = 50 , left side = 2.42632851043291e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.04094155534067e-2
n = 100 , left side = 1.12466925545656e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.85640245007841e-2
n = 200 , left side = 5.40875852362391e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.90976124233506e-2
n = 500 , left side = 2.11285351660356e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07910467263608e-2
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 3.17390534271939e-2
n = 20 , left side = 6.03397370785074e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.24830655330717e-2
n = 50 , left side = 1.74893080184918e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.71833926392439e-2
n = 100 , left side = 7.79966635748684e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.20110506978629e-2
n = 200 , left side = 3.67816819644862e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.08282027505259e-2
n = 500 , left side = 1.41984974971862e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14840504932457e-2
```

$$x^{10}$$

```
n = 10 , left side = 7.68027797084297e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.22723451788458e-1
n = 20 , left side = 9.76146773173455e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.13061334879844e-1
n = 50 , left side = 1.13068528957833e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.35420153681574e-2
n = 100 , left side = 3.88474877995740e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94222421773540e-2
n = 200 , left side = 1.62038602245949e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43443323447286e-2
n = 500 , left side = 5.81892063838071e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28457110365805e-2
```

---

x0 = 1/2, Power = 7/10, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96445247579275e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79881706738960e-1
n = 20 , left side = 1.48888789279410e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.07933923683638e-1
n = 50 , left side = 6.77605354912036e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.78966471086154e-2
n = 100 , left side = 3.52568356510696e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.62850334902428e-2
n = 200 , left side = 1.79801315131478e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27083577956597e-2
n = 500 , left side = 7.27768804896778e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.21761314380675e-2
```

x

```
n = 10 , left side = 6.38935662496243e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.35632665247264e-1
n = 20 , left side = 3.46235470985200e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.81992555130590e-2
n = 50 , left side = 1.38629429714340e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.08097576863018e-2
n = 100 , left side = 6.93147149063511e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.28792455647146e-2
n = 200 , left side = 3.46573574531761e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10406352016569e-2
n = 500 , left side = 1.38629429812698e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15176059448373e-2
```

x^2

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.82950363282051e-2
n = 20 , left side = 4.48623512045706e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.79604514070084e-2
n = 50 , left side = 1.55044047114583e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.91682959462775e-2
n = 100 , left side = 7.34183692697721e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.24688801283725e-2
n = 200 , left side = 3.56832710440330e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.09380438425712e-2
n = 500 , left side = 1.40270891558064e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15011913273837e-2
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.04750513551982e-2
n = 20 , left side = 4.22970110547810e-2
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.05257915567980e-2
n = 50 , left side = 1.29223379237350e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.17503627340007e-2
n = 100 , left side = 5.82201903348858e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.39886980218611e-2
n = 200 , left side = 2.75417225524133e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.17521986917332e-2
n = 500 , left side = 1.06440558786375e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.18394946551006e-2
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.69853468154883e-2
n = 20 , left side = 3.49981874860215e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.78246151255575e-2
n = 50 , left side = 9.52960631552963e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.51430943422061e-2
n = 100 , left side = 4.09764755001933e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.57130695053304e-2
n = 200 , left side = 1.88876104704867e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.26176098999258e-2
n = 500 , left side = 7.17895958025169e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.21860042849392e-2
```

x^{10}

```
n = 10 , left side = 4.39432749437959e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.55582956553092e-1
n = 20 , left side = 5.59881198565935e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17223990625920e-1
n = 50 , left side = 6.58122885628412e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.40145777721073e-2
n = 100 , left side = 2.17135216419487e-4
```

```
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.95935818389302e-2
        n = 200 , left side = 8.67799400498142e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44195910069247e-2
        n = 500 , left side = 3.00238003037257e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28738764426606e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.88583358245117e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.80667895672376e-1
        n = 20 , left side = 3.43036193768773e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.19392440673891e-1
        n = 50 , left side = 5.15745217625430e-4
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.41569554401103e-2
        n = 100 , left side = 1.28085535782918e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.96826315195668e-2
        n = 200 , left side = 3.19697272260777e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44744012197484e-2
        n = 500 , left side = 5.11285838611375e-6
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28987873845782e-2
```

$$x$$

```
        n = 10 , left side = 3.03097878388942e-3
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.96495252712999e-1
        n = 20 , left side = 1.79813965208164e-5
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.22804821215058e-1
        n = 50 , left side = 5.04973840520506e-12
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.46727006526860e-2
        n = 100 , left side = 0.000000000000000e0
                1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 3.98107170553497e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 3.13288100022529e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.68197421494635e-1
n = 20 , left side = 9.02981956494564e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.13792983046633e-1
n = 50 , left side = 1.44928066358063e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.32234199941551e-2
n = 100 , left side = 3.62320167826058e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94483968875237e-2
n = 200 , left side = 9.05800419564451e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44157909050181e-2
n = 500 , left side = 1.44928067127847e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28894074362515e-2
```

x^3

```
n = 10 , left side = 4.78600213916087e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.51666210105279e-1
n = 20 , left side = 1.35520533206202e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.09270749290959e-1
n = 50 , left side = 2.17392099772526e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24987796600105e-2
n = 100 , left side = 5.43480251739198e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92672368036105e-2
n = 200 , left side = 1.35870062934806e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43705008840397e-2
n = 500 , left side = 2.17392100697045e-5
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28821610328946e-2
```

x^4

```
n = 10 , left side = 5.14533906505906e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.48072840846297e-1
n = 20 , left side = 1.38732244570935e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.08949578154486e-1
n = 50 , left side = 2.18227896612333e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24904216916124e-2
n = 100 , left side = 5.44002624822598e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92667144305271e-2
n = 200 , left side = 1.35902711252578e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43704682357219e-2
n = 500 , left side = 2.17400458665112e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28821601970978e-2
```

x^{10}

```
n = 10 , left side = 2.39574413183784e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.75568790178510e-1
n = 20 , left side = 2.97086004062650e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19851942570953e-1
n = 50 , left side = 2.83599622557920e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.43891010351778e-2
n = 100 , left side = 6.54249762593842e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97452920790903e-2
n = 200 , left side = 1.60297404173209e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44903412065572e-2
n = 500 , left side = 2.55030753033912e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29013499354340e-2
```

4 Real-valued neural network approximation based on the q-deformed and λ-parametrized half hyperbolic tangent - part 2

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
               ␣
↪print("-------------------------------------------------------------------------------")
                print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
               ␣
↪print("-------------------------------------------------------------------------------")
                #the activation function
                phi(x) = (1-q*(e^(-lamda*x)))/(1+q*(e^(-lamda*x)))   #formula 20.
↪1

                #q-deformed and β-parametrized half hyperbolic tangent
                theta(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 20.8

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [2000, 5000]:
                        #def H(n, f, x):    #real-valued linear neural network␣
↪operators
```

```
                        #    return sum(f(k/n)*theta(n*x-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(theta(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(H(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*theta(n*x0-k) for k in␣
↪[ceil(n*a),..,floor(n*b)])/sum(theta(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)]) - f(x0))

                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 1.95310094358758e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00303417312770e-1
          n = 5000 , left side = 7.83021541616469e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.68969394299569e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 1.96790064404651e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00288617612311e-1
          n = 5000 , left side = 7.85389504806777e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.68945714667666e-2
```

```
--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 9.74889862984551e-4
                    1/n^(3/10) = 1.02256518256357e-1
```

```
                 difference = 1.01281628393373e-1
        n = 5000 , left side = 3.91244982227645e-4
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.72887159893457e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 9.85612814691228e-4
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.01270905441666e-1
        n = 5000 , left side = 3.92960661552144e-4
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.72870003100212e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 4.68201729342255e-6
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.02251836239064e-1
        n = 5000 , left side = 7.49125671828388e-7
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.76792118459016e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 4.68201729242335e-6
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.02251836239065e-1
        n = 5000 , left side = 7.49125673271678e-7
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.76792118459001e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 9.78384108846764e-4
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.01278134147511e-1
        n = 5000 , left side = 3.91803600351071e-4
```

```
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.72881573712223e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 9.82128243529834e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01274390012827e-1
        n = 5000 , left side = 3.92402662611313e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.72875583089621e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 4.88765734908858e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01767752521448e-1
        n = 5000 , left side = 1.95833577701698e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.74841273938717e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 4.91490676762685e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01765027579595e-1
        n = 5000 , left side = 1.96269568850549e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.74836914027228e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 1.19260542830180e-6
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02255325650929e-1
        n = 5000 , left side = 1.90817055156778e-7
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76797701545182e-2
```

$$\cos(x)$$

```
n = 2000 , left side = 1.19260542752464e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255325650930e-1
n = 5000 , left side = 1.90817054823711e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797701545186e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 4.89638706925533e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01766879549432e-1
n = 5000 , left side = 1.95973196963295e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74839877746101e-2
```

$$\cos(x)$$

```
n = 2000 , left side = 4.90618935762188e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01765899320595e-1
n = 5000 , left side = 1.96130033619957e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74838309379534e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 2.44701705652606e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02011816550705e-1
n = 5000 , left side = 9.79677681436364e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75819932034297e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 2.45427135861620e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02011091120496e-1
          n = 5000 , left side = 9.80838370117088e-5
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.75818771345617e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 3.20260086117408e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256197996271e-1
          n = 5000 , left side = 5.12400826213621e-8
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799097314908e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 3.20237313777838e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256198019044e-1
          n = 5000 , left side = 5.12395328389204e-8
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799097320405e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 1.95310094358758e-3
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.04075788314103e-2
          n = 5000 , left side = 7.83021541616469e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.33591140821145e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 1.96790064404651e-3
                    1/n^(1/2) = 2.23606797749979e-2
```

```
                    difference = 2.03927791309514e-2
          n = 5000 , left side = 7.85389504806777e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.33567461189242e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 9.74889862984551e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.13857899120133e-2
          n = 5000 , left side = 3.91244982227645e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.37508906415033e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 9.85612814691228e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.13750669603067e-2
          n = 5000 , left side = 3.92960661552144e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.37491749621788e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 4.68201729342255e-6
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.23559977577045e-2
          n = 5000 , left side = 7.49125671828388e-7
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.41413864980591e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 4.68201729242335e-6
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.23559977577055e-2
          n = 5000 , left side = 7.49125673271678e-7
```

```
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.41413864980577e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 9.78384108846764e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.13822956661511e-2
          n = 5000 , left side = 3.91803600351071e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.37503320233799e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 9.82128243529834e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.13785515314681e-2
          n = 5000 , left side = 3.92402662611313e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.37497329611196e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 4.88765734908858e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.18719140400890e-2
          n = 5000 , left side = 1.95833577701698e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.39463020460293e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 4.91490676762685e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.18691890982352e-2
          n = 5000 , left side = 1.96269568850549e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.39458660548804e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 1.19260542830180e-6
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.23594871695696e-2
          n = 5000 , left side = 1.90817055156778e-7
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.41419448066758e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 1.19260542752464e-6
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.23594871695704e-2
          n = 5000 , left side = 1.90817054823711e-7
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.41419448066761e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 4.89638706925533e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.18710410680724e-2
          n = 5000 , left side = 1.95973196963295e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.39461624267677e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 4.90618935762188e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.18700608392357e-2
          n = 5000 , left side = 1.96130033619957e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.39460055901110e-2
```

```
--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 2.44701705652606e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.21159780693453e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [x^(1/3), x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for power in powers:
    ##########################################################
    for lamda in lamdas:  #going over each lamda value
    ##########################################################
        for q in qs:      #going over each q value
        ##########################################################
            print()
            print()
           ␣
↪print("--------------------------------------------------------------------------------")
            print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
           ␣
↪print("--------------------------------------------------------------------------------")
            #the activation function
            phi(x) = (1-q*(e^(-lamda*x)))/(1+q*(e^(-lamda*x)))   #formula 20.1

            #q-deformed and β-parametrized half hyperbolic tangent
            theta(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 20.8

            ##########################################################
            for i in range(len(funcs)):
            ##########################################################
                f(x)=funcs[i]
                show(f(x))
```

```
                for n in [2000, 5000]:
                    #def H(n, f, x):    #real-valued linear neural network␣
↪operators
                    #    return sum(f(k/n)*theta(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(theta(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                    #leftSide = abs(H(n,f,x0)-f(x0))
                    leftSide = abs(sum(f(k/n)*theta(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(theta(n*x0-k) for k in [ceil(n*a),..,floor(n*b)]) - f(x0))

                    val1 = n
                    val2 = leftSide.n()
                    val3 = 1/(n^power).n()
                    print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 1.45973769075280e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00796780565605e-1
          n = 5000 , left side = 5.85650001354687e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.70943109702187e-2
```

$$x$$

```
          n = 2000 , left side = 2.77258872223973e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 9.94839295341176e-2
          n = 5000 , left side = 1.10903548889585e-3
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.65709254826775e-2
```

$$x^2$$

```
          n = 2000 , left side = 2.79351877633044e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 9.94629994800269e-2
          n = 5000 , left side = 1.11238429755101e-3
```

```
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.65675766740224e-2
```

$$x^3$$

```
n = 2000 , left side = 2.11096808695638e-3
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.00145550169401e-1
n = 5000 , left side = 8.36808243358689e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.68431527282147e-2
```

$$x^4$$

```
n = 2000 , left side = 1.41795377434802e-3
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.00838564482009e-1
n = 5000 , left side = 5.59557820777254e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.71204031507961e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.79591945905002e-5
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02198559061767e-1
n = 5000 , left side = 2.22575140037271e-5
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76577034575697e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.28207805430148e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01528310450927e-1
n = 5000 , left side = 2.92559548393356e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.73874014231800e-2
```

$$x$$

```
n = 2000 , left side = 1.38629436112003e-3
                1/n^(3/10) = 1.02256518256357e-1
```

```
          difference = 1.00870223895237e-1
n = 5000 , left side = 5.54517744448035e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.71254432271253e-2
```

$$x^2$$

```
n = 2000 , left side = 1.40145897904348e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.00855059277314e-1
n = 5000 , left side = 5.56944083316024e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.71230168882574e-2
```

$$x^3$$

```
n = 2000 , left side = 1.06252543720417e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01193992819153e-1
n = 5000 , left side = 4.19531511964305e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.72604294596091e-2
```

$$x^4$$

```
n = 2000 , left side = 7.16010476710327e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01540507779647e-1
n = 5000 , left side = 2.80905793970901e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.73990551776025e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.97988137052012e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02226719442652e-1
n = 5000 , left side = 1.12604691755727e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76687005023978e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 4.67186009045495e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02251846396267e-1
n = 5000 , left side = 7.47446048499079e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76792135255249e-2
```

x

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256518256357e-1
n = 5000 , left side = 0.000000000000000e0
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799609715734e-2
```

x^2

```
n = 2000 , left side = 1.32428058677303e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02243275450490e-1
n = 5000 , left side = 2.11884893858150e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76778421226348e-2
```

x^3

```
n = 2000 , left side = 1.98642088022338e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02236654047555e-1
n = 5000 , left side = 3.17827340845511e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76767826981649e-2
```

x^4

```
n = 2000 , left side = 1.98649427157888e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02236653313642e-1
n = 5000 , left side = 3.17829219639854e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76767826793770e-2
```

x^{10}

```
n = 2000 , left side = 2.33024632642588e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02254188010031e-1
```

```
          n = 5000 , left side = 3.72515568407197e-7
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76795884560050e-2


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 7.31673691973578e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01524844564384e-1
          n = 5000 , left side = 2.93115579032444e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.73868453925409e-2
```

$$x$$

```
          n = 2000 , left side = 1.38629436111992e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00870223895237e-1
          n = 5000 , left side = 5.54517744448035e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.71254432271253e-2
```

$$x^2$$

```
          n = 2000 , left side = 1.39158937464245e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00864928881715e-1
          n = 5000 , left side = 5.55364946611514e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.71245960249619e-2
```

$$x^3$$

```
          n = 2000 , left side = 1.04767998407174e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01208838272286e-1
          n = 5000 , left side = 4.17160179930126e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.72628007916433e-2
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443719e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01555395079914e-1
n = 5000 , left side = 2.78531814463245e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74014291571101e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.80227731769833e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02228495483180e-1
n = 5000 , left side = 1.09803560975753e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76689806154758e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.65410972395175e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01891107283962e-1
n = 5000 , left side = 1.46489688196749e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75334712833766e-2
```

$$x$$

```
n = 2000 , left side = 6.93147180560016e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01563371075797e-1
n = 5000 , left side = 2.77258872223851e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74027020993495e-2
```

$$x^2$$

```
n = 2000 , left side = 6.97000835040928e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01559517421316e-1
n = 5000 , left side = 2.77875456940913e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74020855146325e-2
```

$$x^3$$

```
n = 2000 , left side = 5.25648214541374e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01730870041816e-1
n = 5000 , left side = 2.08869501476971e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74710914700964e-2
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871019e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01904149432486e-1
n = 5000 , left side = 1.39555255115609e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75404057164578e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079194571e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02242295748438e-1
n = 5000 , left side = 5.52404203239387e-6
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76744369295410e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/2, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097009217e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02255328315387e-1
n = 5000 , left side = 1.90387244969337e-7
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76797705843284e-2
```

$$x$$

```
n = 2000 , left side = 1.11022302462516e-16
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02256518256357e-1
n = 5000 , left side = 0.000000000000000e0
```

```
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76799609715734e-2
```

$$x^2$$

```
n = 2000 , left side = 3.37320146703846e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02253145054890e-1
n = 5000 , left side = 5.39712234737255e-7
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76794212593386e-2
```

$$x^3$$

```
n = 2000 , left side = 5.05980220058544e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02251458454157e-1
n = 5000 , left side = 8.09568352105883e-7
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76791514032213e-2
```

$$x^4$$

```
n = 2000 , left side = 5.05984931555015e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02251458407042e-1
n = 5000 , left side = 8.09569558168910e-7
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76791514020152e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.93100185746322e-7
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02255925156172e-1
n = 5000 , left side = 9.48752487690396e-8
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76798660963246e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383739010e-4
          1/n^(3/10) = 1.02256518256357e-1
```

```
          difference = 1.01890238872618e-1
n = 5000 , left side = 1.46628824906569e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75333321466668e-2
```

x

```
n = 2000 , left side = 6.93147191573207e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01563371064784e-1
n = 5000 , left side = 2.77258876629438e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74027020949439e-2
```

x^2

```
n = 2000 , left side = 6.94533444929368e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01561984811428e-1
n = 5000 , left side = 2.77480677166320e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74024802944071e-2
```

x^3

```
n = 2000 , left side = 5.21941990297453e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01734576266060e-1
n = 5000 , left side = 2.08277000138812e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74716839714346e-2
```

x^4

```
n = 2000 , left side = 3.48657415094475e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01907860841263e-1
n = 5000 , left side = 1.38962422999142e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75409985485742e-2
```

x^{10}

```
n = 2000 , left side = 1.37838066332147e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02242734449724e-1
n = 5000 , left side = 5.45433431815541e-6
          1/n^(3/10) = 7.76799609715734e-2
```

```
                    difference = 7.76745066372552e-2


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 1.83022238704367e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02073496017653e-1
          n = 5000 , left side = 7.32956220087511e-5
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76066653495646e-2
```

$$x$$

```
          n = 2000 , left side = 3.46573574531495e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01909944681826e-1
          n = 5000 , left side = 1.38629429812687e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.75413315417607e-2
```

$$x^2$$

```
          n = 2000 , left side = 3.47599488122630e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01908918768235e-1
          n = 5000 , left side = 1.38793575987228e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.75411673955862e-2
```

$$x^3$$

```
          n = 2000 , left side = 2.61470034692929e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01995048221664e-1
          n = 5000 , left side = 1.04218354559399e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.75757426170140e-2
```

$$x^4$$

```
          n = 2000 , left side = 1.74827628399418e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02081690627958e-1
```

```
n = 5000 , left side = 6.95610601449959e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76103999114284e-2
```

$$x^{10}$$

```
n = 2000 , left side = 6.95028639556713e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02249567969962e-1
n = 5000 , left side = 2.73651920556519e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76772244523678e-2


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.19528047798556e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256198728310e-1
n = 5000 , left side = 5.11242584932958e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799098473149e-2
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256518256357e-1
n = 5000 , left side = 0.000000000000000e0
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799609715734e-2
```

$$x^2$$

```
n = 2000 , left side = 9.05800419392921e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255612455938e-1
n = 5000 , left side = 1.44928067158379e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76798160435062e-2
```

$$x^3$$

```
n = 2000 , left side = 1.35870062942245e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255159555728e-1
n = 5000 , left side = 2.17392100737568e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797435794726e-2
```

$$x^4$$

```
n = 2000 , left side = 1.35870389404713e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255159552463e-1
n = 5000 , left side = 2.17392184295728e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797435793891e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.59233443336286e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256359022914e-1
n = 5000 , left side = 2.54759102073614e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799354956632e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.45973769075280e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.09009420842451e-2
n = 5000 , left side = 5.85650001354687e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35564856223763e-2
```

$$x$$

```
n = 2000 , left side = 2.77258872223973e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 1.95880910527582e-2
n = 5000 , left side = 1.10903548889585e-3
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.30331001348351e-2
```

$$x^2$$

```
n = 2000 , left side = 2.79351877633044e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 1.95671609986675e-2
n = 5000 , left side = 1.11238429755101e-3
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.30297513261799e-2
```

$$x^3$$

```
n = 2000 , left side = 2.11096808695638e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.02497116880415e-2
n = 5000 , left side = 8.36808243358689e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.33053273803723e-2
```

$$x^4$$

```
n = 2000 , left side = 1.41795377434802e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.09427260006499e-2
n = 5000 , left side = 5.59557820777254e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35825778029537e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.79591945905002e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23027205804074e-2
n = 5000 , left side = 2.22575140037271e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41198781097272e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.28207805430148e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16324719695677e-2
n = 5000 , left side = 2.92559548393356e-4
```

```
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38495760753376e-2
```

x

```
n = 2000 , left side = 1.38629436112003e-3
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.09743854138779e-2
n = 5000 , left side = 5.54517744448035e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.35876178792829e-2
```

x^2

```
n = 2000 , left side = 1.40145897904348e-3
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.09592207959544e-2
n = 5000 , left side = 5.56944083316024e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.35851915404149e-2
```

x^3

```
n = 2000 , left side = 1.06252543720417e-3
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.12981543377937e-2
n = 5000 , left side = 4.19531511964305e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.37226041117666e-2
```

x^4

```
n = 2000 , left side = 7.16010476710327e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.16446692982876e-2
n = 5000 , left side = 2.80905793970901e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38612298297600e-2
```

x^{10}

```
n = 2000 , left side = 2.97988137052012e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23308809612927e-2
n = 5000 , left side = 1.12604691755727e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41308751545554e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 4.67186009045495e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23560079149074e-2
n = 5000 , left side = 7.47446048499079e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41413881776825e-2
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749979e-2
n = 5000 , left side = 0.000000000000000e0
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421356237310e-2
```

$$x^2$$

```
n = 2000 , left side = 1.32428058677303e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23474369691302e-2
n = 5000 , left side = 2.11884893858150e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41400167747924e-2
```

$$x^3$$

```
n = 2000 , left side = 1.98642088022338e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23408155661957e-2
n = 5000 , left side = 3.17827340845511e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41389573503225e-2
```

$$x^4$$

```
n = 2000 , left side = 1.98649427157888e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23408148322821e-2
n = 5000 , left side = 3.17829219639854e-6
```

```
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41389573315346e-2
```

$$x^{10}$$

```
      n = 2000 , left side = 2.33024632642588e-6
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23583495286715e-2
      n = 5000 , left side = 3.72515568407197e-7
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41417631081625e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
      n = 2000 , left side = 7.31673691973578e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.16290060830243e-2
      n = 5000 , left side = 2.93115579032444e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.38490200446985e-2
```

$$x$$

```
      n = 2000 , left side = 1.38629436111992e-3
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.09743854138780e-2
      n = 5000 , left side = 5.54517744448035e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.35876178792829e-2
```

$$x^2$$

```
      n = 2000 , left side = 1.39158937464245e-3
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.09690904003554e-2
      n = 5000 , left side = 5.55364946611514e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.35867706771194e-2
```

$$x^3$$

```
      n = 2000 , left side = 1.04767998407174e-3
                1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.13129997909262e-2
n = 5000 , left side = 4.17160179930126e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.37249754438008e-2
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443719e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.16595565985542e-2
n = 5000 , left side = 2.78531814463245e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38636038092677e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.80227731769833e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23326570018209e-2
n = 5000 , left side = 1.09803560975753e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41311552676334e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.65410972395175e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.19952688026027e-2
n = 5000 , left side = 1.46489688196749e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39956459355342e-2
```

$$x$$

```
n = 2000 , left side = 6.93147180560016e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.16675325944379e-2
n = 5000 , left side = 2.77258872223851e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38648767515071e-2
```

$$x^2$$

```
n = 2000 , left side = 6.97000835040928e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16636789399570e-2
n = 5000 , left side = 2.77875456940913e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38642601667900e-2
```

$$x^3$$

```
n = 2000 , left side = 5.25648214541374e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.18350315604565e-2
n = 5000 , left side = 2.08869501476971e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39332661222540e-2
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871019e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20083109511269e-2
n = 5000 , left side = 1.39555255115609e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40025803686153e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079194571e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23464572670784e-2
n = 5000 , left side = 5.52404203239387e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41366115816986e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/2, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097009217e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23594898340278e-2
n = 5000 , left side = 1.90387244969337e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41419452364860e-2
```

$$x$$

```
n = 2000 , left side = 1.11022302462516e-16
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749978e-2
n = 5000 , left side = 0.000000000000000e0
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421356237310e-2
```

$$x^2$$

```
n = 2000 , left side = 3.37320146703846e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23573065735309e-2
n = 5000 , left side = 5.39712234737255e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41415959114962e-2
```

$$x^3$$

```
n = 2000 , left side = 5.05980220058544e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23556199727973e-2
n = 5000 , left side = 8.09568352105883e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41413260553788e-2
```

$$x^4$$

```
n = 2000 , left side = 5.05984931555015e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23556199256823e-2
n = 5000 , left side = 8.09569558168910e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41413260541728e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.93100185746322e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23600866748122e-2
n = 5000 , left side = 9.48752487690396e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420407484822e-2
```

```
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383739010e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.19944003912589e-2
n = 5000 , left side = 1.46628824906569e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39955067988244e-2
```

$$x$$

```
n = 2000 , left side = 6.93147191573207e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16675325834247e-2
n = 5000 , left side = 2.77258876629438e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38648767471015e-2
```

$$x^2$$

```
n = 2000 , left side = 6.94533444929368e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16661463300685e-2
n = 5000 , left side = 2.77480677166320e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38646549465646e-2
```

$$x^3$$

```
n = 2000 , left side = 5.21941990297453e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.18387377847004e-2
n = 5000 , left side = 2.08277000138812e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39338586235921e-2
```

$$x^4$$

```
n = 2000 , left side = 3.48657415094475e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20120223599034e-2
n = 5000 , left side = 1.38962422999142e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40031732007318e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.37838066332147e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23468959683647e-2
n = 5000 , left side = 5.45433431815541e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41366812894128e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83022238704367e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.21776575362935e-2
n = 5000 , left side = 7.32956220087511e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40688400017222e-2
```

$$x$$

```
n = 2000 , left side = 3.46573574531495e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20141062004664e-2
n = 5000 , left side = 1.38629429812687e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40035061939183e-2
```

$$x^2$$

```
n = 2000 , left side = 3.47599488122630e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20130802868753e-2
n = 5000 , left side = 1.38793575987228e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40033420477437e-2
```

$$x^3$$

```
n = 2000 , left side = 2.61470034692929e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20992097403050e-2
n = 5000 , left side = 1.04218354559399e-4
```

```
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.40379172691716e-2
```

$$x^4$$

```
        n = 2000 , left side = 1.74827628399418e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.21858521465985e-2
        n = 5000 , left side = 6.95610601449959e-5
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.40725745635860e-2
```

$$x^{10}$$

```
        n = 2000 , left side = 6.95028639556713e-6
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23537294886023e-2
        n = 5000 , left side = 2.73651920556519e-6
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41393991045254e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 2000 , left side = 3.19528047798556e-7
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23603602469501e-2
        n = 5000 , left side = 5.11242584932958e-8
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41420844994725e-2
```

$$x$$

```
        n = 2000 , left side = 0.000000000000000e0
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23606797749979e-2
        n = 5000 , left side = 0.000000000000000e0
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41421356237310e-2
```

$$x^2$$

```
        n = 2000 , left side = 9.05800419392921e-7
                1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.23597739745785e-2
n = 5000 , left side = 1.44928067158379e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41419906956638e-2
```

$$x^3$$

```
n = 2000 , left side = 1.35870062942245e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23593210743685e-2
n = 5000 , left side = 2.17392100737568e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41419182316302e-2
```

$$x^4$$

```
n = 2000 , left side = 1.35870389404713e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23593210711038e-2
n = 5000 , left side = 2.17392184295728e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41419182315467e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.59233443336286e-7
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23605205415546e-2
n = 5000 , left side = 2.54759102073614e-8
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41421101478207e-2
```

---

x0 = 1/2, Power = 7/10, lamda = 1/4, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.45973769075280e-3
          1/n^(7/10) = 4.88966384271464e-3
          difference = 3.42992615196184e-3
n = 5000 , left side = 5.85650001354687e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 1.98901658573576e-3
```

$$x$$

```
n = 2000 , left side = 2.77258872223973e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 2.11707512047491e-3
n = 5000 , left side = 1.10903548889585e-3
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.46563109819460e-3
```

$$x^2$$

```
n = 2000 , left side = 2.79351877633044e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 2.09614506638421e-3
n = 5000 , left side = 1.11238429755101e-3
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.46228228953944e-3
```

$$x^3$$

```
n = 2000 , left side = 2.11096808695638e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 2.77869575575827e-3
n = 5000 , left side = 8.36808243358689e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.73785834373176e-3
```

$$x^4$$

```
n = 2000 , left side = 1.41795377434802e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.47171006836663e-3
n = 5000 , left side = 5.59557820777254e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.01510876631319e-3
```

$$x^{10}$$

```
n = 2000 , left side = 5.79591945905002e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.83170464812414e-3
n = 5000 , left side = 2.22575140037271e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.55240907308672e-3
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.28207805430148e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.16145603728450e-3
n = 5000 , left side = 2.92559548393356e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.28210703869709e-3
```

$$x$$

```
n = 2000 , left side = 1.38629436112003e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.50336948159461e-3
n = 5000 , left side = 5.54517744448035e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.02014884264241e-3
```

$$x^2$$

```
n = 2000 , left side = 1.40145897904348e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.48820486367116e-3
n = 5000 , left side = 5.56944083316024e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.01772250377442e-3
```

$$x^3$$

```
n = 2000 , left side = 1.06252543720417e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.82713840551047e-3
n = 5000 , left side = 4.19531511964305e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.15513507512614e-3
```

$$x^4$$

```
n = 2000 , left side = 7.16010476710327e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.17365336600432e-3
n = 5000 , left side = 2.80905793970901e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29376079311955e-3
```

$$x^{10}$$

```
          n = 2000 , left side = 2.97988137052012e-5
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.85986502900944e-3
          n = 5000 , left side = 1.12604691755727e-5
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.56340611791488e-3


-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 4.67186009045495e-6
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.88499198262419e-3
          n = 5000 , left side = 7.47446048499079e-7
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57391914104195e-3
```

$$x$$

```
          n = 2000 , left side = 0.000000000000000e0
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.88966384271464e-3
          n = 5000 , left side = 0.000000000000000e0
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57466658709045e-3
```

$$x^2$$

```
          n = 2000 , left side = 1.32428058677303e-5
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.87642103684691e-3
          n = 5000 , left side = 2.11884893858150e-6
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57254773815187e-3
```

$$x^3$$

```
          n = 2000 , left side = 1.98642088022338e-5
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.86979963391241e-3
          n = 5000 , left side = 3.17827340845511e-6
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57148831368199e-3
```

$$x^4$$

```
n = 2000 , left side = 1.98649427157888e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.86979889999886e-3
n = 5000 , left side = 3.17829219639854e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57148829489405e-3
```

$$x^{10}$$

```
n = 2000 , left side = 2.33024632642588e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88733359638822e-3
n = 5000 , left side = 3.72515568407197e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57429407152204e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1/2, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.31673691973578e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.15799015074107e-3
n = 5000 , left side = 2.93115579032444e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.28155100805800e-3
```

$$x$$

```
n = 2000 , left side = 1.38629436111992e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.50336948159472e-3
n = 5000 , left side = 5.54517744448035e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.02014884264241e-3
```

$$x^2$$

```
n = 2000 , left side = 1.39158937464245e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.49807446807219e-3
n = 5000 , left side = 5.55364946611514e-4
```

```
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.01930164047893e-3
```

$$x^3$$

```
n = 2000 , left side = 1.04767998407174e-3
                1/n^(7/10) = 4.88966384271464e-3
                difference = 3.84198385864291e-3
n = 5000 , left side = 4.17160179930126e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.15750640716032e-3
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443719e-4
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.18854066627093e-3
n = 5000 , left side = 2.78531814463245e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.29613477262720e-3
```

$$x^{10}$$

```
n = 2000 , left side = 2.80227731769833e-5
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.86164106953766e-3
n = 5000 , left side = 1.09803560975753e-5
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.56368623099287e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.65410972395175e-4
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.52425287031947e-3
n = 5000 , left side = 1.46489688196749e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.42817689889370e-3
```

$$x$$

```
n = 2000 , left side = 6.93147180560016e-4
                1/n^(7/10) = 4.88966384271464e-3
```

```
          difference = 4.19651666215463e-3
n = 5000 , left side = 2.77258872223851e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.29740771486660e-3
```

$$x^2$$

```
n = 2000 , left side = 6.97000835040928e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.19266300767372e-3
n = 5000 , left side = 2.77875456940913e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.29679113014954e-3
```

$$x^3$$

```
n = 2000 , left side = 5.25648214541374e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.36401562817327e-3
n = 5000 , left side = 2.08869501476971e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.36579708561348e-3
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871019e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.53729501884363e-3
n = 5000 , left side = 1.39555255115609e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.43511133197484e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079194571e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.87544133479519e-3
n = 5000 , left side = 5.52404203239387e-6
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.56914254505805e-3
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097009217e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88847390174455e-3
n = 5000 , left side = 1.90387244969337e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57447619984548e-3
```

x

```
n = 2000 , left side = 1.11022302462516e-16
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271453e-3
n = 5000 , left side = 0.000000000000000e0
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57466658709045e-3
```

x^2

```
n = 2000 , left side = 3.37320146703846e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88629064124761e-3
n = 5000 , left side = 5.39712234737255e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57412687485571e-3
```

x^3

```
n = 2000 , left side = 5.05980220058544e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88460404051406e-3
n = 5000 , left side = 8.09568352105883e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57385701873834e-3
```

x^4

```
n = 2000 , left side = 5.05984931555015e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88460399339909e-3
n = 5000 , left side = 8.09569558168910e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57385701753228e-3
```

x^{10}

```
n = 2000 , left side = 5.93100185746322e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88907074252890e-3
```

```
          n = 5000 , left side = 9.48752487690396e-8
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57457171184168e-3


-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 3.66279383739010e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.52338445897563e-3
          n = 5000 , left side = 1.46628824906569e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.42803776218388e-3
```

$$x$$

```
          n = 2000 , left side = 6.93147191573207e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.19651665114144e-3
          n = 5000 , left side = 2.77258876629438e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.29740771046101e-3
```

$$x^2$$

```
          n = 2000 , left side = 6.94533444929368e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.19513039778528e-3
          n = 5000 , left side = 2.77480677166320e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.29718590992413e-3
```

$$x^3$$

```
          n = 2000 , left side = 5.21941990297453e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.36772185241719e-3
          n = 5000 , left side = 2.08277000138812e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.36638958695164e-3
```

$$x^4$$

```
n = 2000 , left side = 3.48657415094475e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54100642762017e-3
n = 5000 , left side = 1.38962422999142e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43570416409131e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.37838066332147e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.87588003608143e-3
n = 5000 , left side = 5.45433431815541e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.56921225277229e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83022238704367e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.70664160401028e-3
n = 5000 , left side = 7.32956220087511e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.50137096508170e-3
```

$$x$$

```
n = 2000 , left side = 3.46573574531495e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54309026818315e-3
n = 5000 , left side = 1.38629429812687e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43603715727776e-3
```

$$x^2$$

```
n = 2000 , left side = 3.47599488122630e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54206435459201e-3
n = 5000 , left side = 1.38793575987228e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43587301110322e-3
```

$$x^3$$

```
n = 2000 , left side = 2.61470034692929e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.62819380802172e-3
n = 5000 , left side = 1.04218354559399e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.47044823253105e-3
```

$$x^4$$

```
n = 2000 , left side = 1.74827628399418e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.71483621431523e-3
n = 5000 , left side = 6.95610601449959e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.50510552694545e-3
```

$$x^{10}$$

```
n = 2000 , left side = 6.95028639556713e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88271355631908e-3
n = 5000 , left side = 2.73651920556519e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57193006788488e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.19528047798556e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88934431466685e-3
n = 5000 , left side = 5.11242584932958e-8
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57461546283196e-3
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271464e-3
n = 5000 , left side = 0.000000000000000e0
```

```
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57466658709045e-3
```

x^2

```
n = 2000 , left side = 9.05800419392921e-7
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88875804229525e-3
n = 5000 , left side = 1.44928067158379e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57452165902329e-3
```

x^3

```
n = 2000 , left side = 1.35870062942245e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88830514208522e-3
n = 5000 , left side = 2.17392100737568e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57444919498971e-3
```

x^4

```
n = 2000 , left side = 1.35870389404713e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88830513882060e-3
n = 5000 , left side = 2.17392184295728e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57444919490615e-3
```

x^{10}

```
n = 2000 , left side = 1.59233443336286e-7
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88950460927131e-3
n = 5000 , left side = 2.54759102073614e-8
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57464111118024e-3
```

5 Real-valued neural network approximation based on the q-deformed and λ-parametrized half hyperbolic tangent - part 3

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
               ␣
↪print("-------------------------------------------------------------------------------")
                print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
               ␣
↪print("-------------------------------------------------------------------------------")
                #the activation function
                phi(x) = (1-q*(e^(-lamda*x)))/(1+q*(e^(-lamda*x)))   #formula 20.
↪1

                #q-deformed and β-parametrized half hyperbolic tangent
                theta(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 20.8

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [10000, 20000]:
                        #def H(n, f, x):    #real-valued linear neural network␣
↪operators
```

```
                        #    return sum(f(k/n)*theta(n*x-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(theta(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(H(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*theta(n*x0-k) for k in␣
↪[ceil(n*a),..,floor(n*b)])/sum(theta(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)]) - f(x0))

                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10000 , left side = 3.91807137845590e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.27039273101737e-2
          n = 20000 , left side = 1.95977614287912e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.10536838909725e-2
```

$$\cos(x)$$

```
          n = 10000 , left side = 3.92399129039323e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.27033353189800e-2
          n = 20000 , left side = 1.96125612112796e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.10535358931476e-2
```

```
--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10000 , left side = 1.95837114215336e-4
                    1/n^(3/10) = 6.30957344480193e-2
```

```
                difference = 6.28998973338040e-2
        n = 20000 , left side = 9.79721925242760e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11516893127361e-2
```

$$\cos(x)$$

```
        n = 10000 , left side = 1.96266034298231e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.28994684137211e-2
        n = 20000 , left side = 9.80794225604598e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11515820826999e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10000 , left side = 1.87281521513150e-7
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30955471664978e-2
        n = 20000 , left side = 4.68203866788031e-8
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496146848737e-2
```

$$\cos(x)$$

```
        n = 10000 , left side = 1.87281522623373e-7
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30955471664967e-2
        n = 20000 , left side = 4.68203866788031e-8
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496146848737e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [x^(1/3), x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for power in powers:
    ##########################################################
    for lamda in lamdas:  #going over each lamda value
    ##########################################################
        for q in qs:      #going over each q value
        ############################################################
            print()
            print()
           ␣
↪print("-------------------------------------------------------------------------------")
            print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
           ␣
↪print("-------------------------------------------------------------------------------")
            #the activation function
            phi(x) = (1-q*(e^(-lamda*x)))/(1+q*(e^(-lamda*x)))   #formula 20.1

            #q-deformed and β-parametrized half hyperbolic tangent
            theta(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 20.8

            ##########################################################
            for i in range(len(funcs)):
            ##########################################################
                f(x)=funcs[i]
                show(f(x))
                for n in [10000, 20000]:
                    #def H(n, f, x):    #real-valued linear neural network␣
↪operators
                    #    return sum(f(k/n)*theta(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(theta(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                    #leftSide = abs(H(n,f,x0)-f(x0))
                    leftSide = abs(sum(f(k/n)*theta(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(theta(n*x0-k) for k in [ceil(n*a),..,floor(n*b)]) - f(x0))
```

```
                    val1 = n
                    val2 = leftSide.n()
                    val3 = 1/(n^power).n()
                    print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 2.93119100095551e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.28026153479238e-2
          n = 20000 , left side = 1.46633227955606e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11030282773048e-2
```

$$x$$

```
          n = 10000 , left side = 5.54517744447813e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.25412167035715e-2
          n = 20000 , left side = 2.77258872223740e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.09724026330366e-2
```

$$x^2$$

```
          n = 10000 , left side = 5.55354946611630e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.25403795014077e-2
          n = 20000 , left side = 2.77468172764916e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.09721933324955e-2
```

$$x^3$$

```
          n = 10000 , left side = 4.17145163294497e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.26785892847248e-2
          n = 20000 , left side = 2.08258236443520e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.10414032688169e-2
```

$$x^4$$

```
n = 10000 , left side = 2.78516781141852e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28172176668775e-2
n = 20000 , left side = 1.38943649991924e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11107178552685e-2
```

$$x^{10}$$

```
n = 10000 , left side = 1.09785825246770e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30847558654947e-2
n = 20000 , left side = 5.45212716758178e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12442093780928e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46493212512588e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29492412355067e-2
n = 20000 , left side = 7.33000327566291e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11763614725037e-2
```

$$x$$

```
n = 10000 , left side = 2.77258872224073e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28184755757953e-2
n = 20000 , left side = 1.38629436112425e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11110320691480e-2
```

$$x^2$$

```
n = 10000 , left side = 2.77865456940862e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28178689910785e-2
n = 20000 , left side = 1.38781082291206e-4
```

```
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11108804229692e-2
```

$$x^3$$

```
n = 10000 , left side = 2.08854493159272e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.28868799548601e-2
n = 20000 , left side = 1.04199604092275e-4
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11454619011681e-2
```

$$x^4$$

```
n = 10000 , left side = 1.39540238443606e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.29561942095757e-2
n = 20000 , left side = 6.95423028884978e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11801192023719e-2
```

$$x^{10}$$

```
n = 10000 , left side = 5.52227630148863e-6
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30902121717178e-2
n = 20000 , left side = 2.73431715288003e-6
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12469271881075e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.86859671957862e-7
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30955475883474e-2
n = 20000 , left side = 4.67148029148490e-8
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496147904575e-2
```

$$x$$

```
n = 10000 , left side = 0.000000000000000e0
                1/n^(3/10) = 6.30957344480193e-2
```

```
          difference = 6.30957344480193e-2
n = 20000 , left side = 0.000000000000000e0
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496615052604e-2
```

$$x^2$$

```
n = 10000 , left side = 5.29712234687008e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30952047357846e-2
n = 20000 , left side = 1.32428058685630e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12495290772017e-2
```

$$x^3$$

```
n = 10000 , left side = 7.94568352058267e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30949398796673e-2
n = 20000 , left side = 1.98642088000689e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12494628631724e-2
```

$$x^4$$

```
n = 10000 , left side = 7.94569526202382e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30949398784931e-2
n = 20000 , left side = 1.98642161344798e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12494628630990e-2
```

$$x^{10}$$

```
n = 10000 , left side = 9.31173332731437e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956413306861e-2
n = 20000 , left side = 2.32786099916681e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496382266504e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46632346878617e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29491021011407e-2
n = 20000 , left side = 7.33348323107563e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11763266729496e-2
```

x

```
n = 10000 , left side = 2.77258872223962e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28184755757954e-2
n = 20000 , left side = 1.38629436112314e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11110320691481e-2
```

x^2

```
n = 10000 , left side = 2.77470672764957e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28182637752544e-2
n = 20000 , left side = 1.38682386247313e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11109791190131e-2
```

x^3

```
n = 10000 , left side = 2.08261988522918e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28874724594964e-2
n = 20000 , left side = 1.04051518979742e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11456099862806e-2
```

x^4

```
n = 10000 , left side = 1.38947404154002e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29567870438653e-2
n = 20000 , left side = 6.93941766602424e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11802673286001e-2
```

x^{10}

```
n = 10000 , left side = 5.45256858088526e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30902818794385e-2
```

```
          n = 20000 , left side = 2.71692949489690e-6
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12469445757655e-2


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 7.32991512727432e-5
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30224352967466e-2
          n = 20000 , left side = 3.66631610069224e-5
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12129983442535e-2
```

$$x$$

```
          n = 10000 , left side = 1.38629436112092e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.29571050119072e-2
          n = 20000 , left side = 6.93147180558240e-5
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11803467872046e-2
```

$$x^2$$

```
          n = 10000 , left side = 1.38783582291191e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.29569508657281e-2
          n = 20000 , left side = 6.93532546007236e-5
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11803082506597e-2
```

$$x^3$$

```
          n = 10000 , left side = 1.04203355132004e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.29915310928873e-2
          n = 20000 , left side = 5.20438507066734e-5
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11976176545537e-2
```

$$x^4$$

```
n = 10000 , left side = 6.95460549745980e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30261883930447e-2
n = 20000 , left side = 3.47151785285438e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149463267318e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.73475758725585e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30929996904321e-2
n = 20000 , left side = 1.36058399651472e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12483009212639e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 4.75966930313376e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956868513263e-2
n = 20000 , left side = 1.18991654307621e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496496060949e-2
```

$$x$$

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957344480193e-2
n = 20000 , left side = 0.000000000000000e0
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496615052604e-2
```

$$x^2$$

```
n = 10000 , left side = 1.34928058781458e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955995199605e-2
n = 20000 , left side = 3.37320146814868e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496277732457e-2
```

$$x^3$$

```
n = 10000 , left side = 2.02392087977898e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955320559314e-2
n = 20000 , left side = 5.05980219667190e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496109072384e-2
```

$$x^4$$

```
n = 10000 , left side = 2.02392163348164e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955320558560e-2
n = 20000 , left side = 5.05980332216049e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496109072272e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.37180700034516e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957107299493e-2
n = 20000 , left side = 5.92947196507640e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496555757884e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.33339519946030e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30224004960247e-2
n = 20000 , left side = 3.66718634815522e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12129896417788e-2
```

$$x$$

```
n = 10000 , left side = 1.38629438315108e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29571050097042e-2
n = 20000 , left side = 6.93147191573873e-5
```

```
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803467861030e-2
```

$$x^2$$

```
n = 10000 , left side = 1.38684888449037e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29570495595703e-2
n = 20000 , left side = 6.93285816908973e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803329235695e-2
```

$$x^3$$

```
n = 10000 , left side = 1.04055271670178e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29916791763492e-2
n = 20000 , left side = 5.20068353849767e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11976546698754e-2
```

$$x^4$$

```
n = 10000 , left side = 6.93979298337505e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30263365181856e-2
n = 20000 , left side = 3.46781577943295e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149833474660e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.71736996733732e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30930170780520e-2
n = 20000 , left side = 1.35624196230164e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12483052632981e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 3.66622776550862e-5
          1/n^(3/10) = 6.30957344480193e-2
```

```
          difference = 6.30590721703642e-2
n = 20000 , left side = 1.83347566429237e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12313267486175e-2
```

x

```
n = 10000 , left side = 6.93147149061213e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30264197331132e-2
n = 20000 , left side = 3.46573574533382e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12150041478070e-2
```

x^2

```
n = 10000 , left side = 6.93557514499510e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30263786965694e-2
n = 20000 , left side = 3.46676165891568e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149938886712e-2
```

x^3

```
n = 10000 , left side = 5.20475988626257e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30436868491567e-2
n = 20000 , left side = 2.60084077772782e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12236530974831e-2
```

x^4

```
n = 10000 , left side = 3.47189280094640e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30610155200099e-2
n = 20000 , left side = 1.73440693989335e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12323174358614e-2
```

x^{10}

```
n = 10000 , left side = 1.36102387438214e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30943734241450e-2
n = 20000 , left side = 6.78705794970912e-7
          1/n^(3/10) = 5.12496615052604e-2
```

```
                    difference = 5.12489827994654e-2


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 1.27810566574738e-8
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30957216669627e-2
          n = 20000 , left side = 3.19526327619002e-9
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496583099971e-2
```

$$x$$

```
          n = 10000 , left side = 0.000000000000000e0
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30957344480193e-2
          n = 20000 , left side = 0.000000000000000e0
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496615052604e-2
```

$$x^2$$

```
          n = 10000 , left side = 3.62320168312280e-8
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30956982160025e-2
          n = 20000 , left side = 9.05800423556258e-9
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496524472561e-2
```

$$x^3$$

```
          n = 10000 , left side = 5.43480251913309e-8
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30956800999941e-2
          n = 20000 , left side = 1.35870063810994e-8
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496479182540e-2
```

$$x^4$$

```
          n = 10000 , left side = 5.43480303955013e-8
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30956800999889e-2
```

```
n = 20000 , left side = 1.35869880207862e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496479182724e-2
```

$$x^{10}$$

```
n = 10000 , left side = 6.36892612715552e-9
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957280790932e-2
n = 20000 , left side = 1.59222856145440e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496599130318e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 2.93119100095551e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.70688089990445e-3
n = 20000 , left side = 1.46633227955606e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.92443458390987e-3
```

$$x$$

```
n = 10000 , left side = 5.54517744447813e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.44548225555219e-3
n = 20000 , left side = 2.77258872223740e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.79380893964174e-3
```

$$x^2$$

```
n = 10000 , left side = 5.55354946611630e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.44464505338837e-3
n = 20000 , left side = 2.77468172764916e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.79359963910056e-3
```

$$x^3$$

```
n = 10000 , left side = 4.17145163294497e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.58285483670550e-3
n = 20000 , left side = 2.08258236443520e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.86280957542195e-3
```

$$x^4$$

```
n = 10000 , left side = 2.78516781141852e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72148321885815e-3
n = 20000 , left side = 1.38943649991924e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93212416187355e-3
```

$$x^{10}$$

```
n = 10000 , left side = 1.09785825246770e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.98902141747532e-3
n = 20000 , left side = 5.45212716758178e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06561568469789e-3
```

---

x0 = 1/2, Power = 1/2, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46493212512588e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.85350678748741e-3
n = 20000 , left side = 7.33000327566291e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99776777910885e-3
```

$$x$$

```
n = 10000 , left side = 2.77258872224073e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72274112777593e-3
n = 20000 , left side = 1.38629436112425e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93243837575305e-3
```

$$x^2$$

```
n = 10000 , left side = 2.77865456940862e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72213454305914e-3
n = 20000 , left side = 1.38781082291206e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93228672957427e-3
```

$$x^3$$

```
n = 10000 , left side = 2.08854493159272e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.79114550684073e-3
n = 20000 , left side = 1.04199604092275e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.96686820777320e-3
```

$$x^4$$

```
n = 10000 , left side = 1.39540238443606e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.86045976155639e-3
n = 20000 , left side = 6.95423028884978e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.00152550897698e-3
```

$$x^{10}$$

```
n = 10000 , left side = 5.52227630148863e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99447772369851e-3
n = 20000 , left side = 2.73431715288003e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06833349471260e-3
```

---

x0 = 1/2, Power = 1/2, lamda = 1/4, q = 1

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.86859671957862e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99981314032804e-3
n = 20000 , left side = 4.67148029148490e-8
```

```
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07102109706256e-3
```

x

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.00000000000000e-2
          difference = 1.00000000000000e-2
n = 20000 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106781186548e-3
```

x^2

```
n = 10000 , left side = 5.29712234687008e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99947028776531e-3
n = 20000 , left side = 1.32428058685630e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07093538380679e-3
```

x^3

```
n = 10000 , left side = 7.94568352058267e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99920543164794e-3
n = 20000 , left side = 1.98642088000689e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07086916977747e-3
```

x^4

```
n = 10000 , left side = 7.94569526202382e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99920543047380e-3
n = 20000 , left side = 1.98642161344798e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07086916970413e-3
```

x^{10}

```
n = 10000 , left side = 9.31173332731437e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99990688266673e-3
n = 20000 , left side = 2.32786099916681e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07104453325548e-3
```

6 Real-valued neural network approximation based on q-deformed and λ-parametrized A-generalized logistic function - introduction

We present in here some of the background and the main result that was proven in the monograph [Parametrized, Deformed and General Neural Networks, Springer, Heidelberg, New York, 2023], in Chapter 16.

The **activation function** [see monograph, formula 16.1], an A-generalized logistic type function used for this part, is defined as follows:

$$\varphi_{q,\lambda}(x) := \frac{1}{1+qA^{-\lambda x}}, \forall\, x \in \mathbb{R},\ where\ q,\ \lambda > 0, A > 1. \tag{5}$$

Then [see monograph, formula 16.5], we present the **density function**:

$$G_{q,\lambda}(x) := \frac{1}{2}(\varphi_{q,\lambda}(x+1) - \varphi_{q,\lambda}(x-1)) > 0,\ \forall x \in \mathbb{R}. \tag{6}$$

Lastly, [see monograph, formula 16.31], we give the real-valued **linear neural network operators**:

$$L_n(f,x) := \frac{\sum_{k=\lceil na \rceil}^{\lfloor nb \rfloor} f(\frac{k}{n}) G_{q,\lambda}(nx-k)}{\sum_{k=\lceil na \rceil}^{\lfloor nb \rfloor} G_{q,\lambda}(nx-k)},\ where\ f \in C([a,b]),\ x \in [a,b]. \tag{7}$$

It was shown [see monograph, Theorem 16.9], that:

$$\lim_{n\to\infty} L_n(f) = f, \tag{8}$$

pointwise and uniformly.

Next, we present our computational results using SageMath. Please note that we removed several of the results generated by the code below.

7 Real-valued neural network approximation based on q-deformed and λ-parametrized A-generalized logistic function - part 1

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

As = [2.5, e, 3] #values for A, they all must be > 2


funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for A in As:
        ##########################################################
        for power in powers:      #going over various powers for 1/x^power
            ##########################################################
            for lamda in lamdas:  #going over each lamda value
            ##########################################################
                for q in qs:      #going over each q value
                ##########################################################
                    print()
                    print()
                   ␣
 ↪print("-------------------------------------------------------------------------------")
                    print("A = "+str(A) + ", Power = "+ str(power)+ ", lamda =␣
 ↪"+ str(lamda) + ",  q = " + str(q) )
                   ␣
 ↪print("-------------------------------------------------------------------------------")

                    #the activation function
                    phi(x) = 1/(1+q*(A^(-lamda*x)))   #formula 16.1

                    #q-deformed and λ-parametrized A-generalized logistic␣
 ↪function
                    G(x) = 1/2*(phi(x+1) - phi(x-1))    #formula 16.5

                    ##########################################################
                    for i in range(len(funcs)):
```

```
                    ##########################################################
                        f(x)=funcs[i]
                        show(f(x))
                        for n in [10, 20, 50, 100, 200, 500]:
                            #def L(n, f, x):    #real-valued linear neural␣
↪network operators
                            #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                            #leftSide = abs(L(n,f,x0)-f(x0))
                            leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in␣
↪[ceil(n*a),..,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)])-f(x0))
                            val1 = n
                            val2 = leftSide.n()
                            val3 = 1/(n^power).n()
                            print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.33415055859522e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.57845728041320e-1
n = 20 , left side = 1.12552824142944e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.94537707393960e-1
n = 50 , left side = 7.03650916520144e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.38884403058977e-1
n = 100 , left side = 3.91179807146498e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.12070662436308e-1
n = 200 , left side = 2.04958927091282e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.83532684627709e-1
n = 500 , left side = 8.41628810006989e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.46575610654764e-1
```

$$\cos(x)$$

```
n = 10 , left side = 5.56661154693738e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = -5.54739210664653e-2
n = 20 , left side = 2.77375170437838e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.29715361099066e-1
n = 50 , left side = 9.82534357579231e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.10996058953069e-1
n = 100 , left side = 4.61457320963173e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.05042911054641e-1
n = 200 , left side = 2.22563374688898e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.81772239867947e-1
n = 500 , left side = 8.69811669306420e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.46293782061770e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.00887404494789e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.61098493177794e-1
n = 20 , left side = 3.83928399692305e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.68697691567674e-1
n = 50 , left side = 3.21179292055399e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.77131565505452e-1
n = 100 , left side = 1.87795288000223e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.32409114350936e-1
n = 200 , left side = 1.00516285091354e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.93976948827702e-1
n = 500 , left side = 4.17660525040209e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50815293504432e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.51696877135891e-1
```

```
                1/n^(3/10) = 5.01187233627272e-1
                difference = 1.49490356491382e-1
        n = 20 , left side = 1.58815595821809e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 2.48274935715095e-1
        n = 50 , left side = 5.23459570459724e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.56903537665019e-1
        n = 100 , left side = 2.38718518518132e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.27316791299145e-1
        n = 200 , left side = 1.13269333013363e-2
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.92701644035501e-1
        n = 500 , left side = 4.38075384751768e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.50611144907316e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.77934495460432e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.23252738166841e-1
        n = 20 , left side = 5.27726087183127e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.54317922818592e-1
        n = 50 , left side = 8.83573450210706e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.00413760208885e-1
        n = 100 , left side = 2.22349166658886e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.48965151484369e-1
        n = 200 , left side = 5.56789565144489e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03471787771692e-1
        n = 500 , left side = 8.91274745238313e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54902771280310e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.75729726788694e-1
                1/n^(3/10) = 5.01187233627272e-1
```

```
                 difference = 3.25457506838579e-1
        n = 20 , left side = 5.27555668114590e-2
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 3.54334964725445e-1
        n = 50 , left side = 8.83573450054709e-3
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 3.00413760210445e-1
        n = 100 , left side = 2.22349166658842e-3
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.48965151484370e-1
        n = 200 , left side = 5.56789565144933e-4
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 2.03471787771692e-1
        n = 500 , left side = 8.91274745232762e-5
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.54902771280310e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.11522468155106e-1
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 3.89664765472167e-1
        n = 20 , left side = 8.25972655210491e-2
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 3.24493266015855e-1
        n = 50 , left side = 3.90806697874810e-2
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 2.70168824923511e-1
        n = 100 , left side = 2.04867976946519e-2
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.30701845456306e-1
        n = 200 , left side = 1.04731898731506e-2
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 1.93555387463686e-1
        n = 500 , left side = 4.24349700945814e-3
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.50748401745376e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 2.77923764210117e-1
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 2.23263469417156e-1
```

```
n = 20 , left side = 1.26343137611376e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.80747393925528e-1
n = 50 , left side = 4.61787798733720e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.63070714837620e-1
n = 100 , left side = 2.22648980816018e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.28923745069356e-1
n = 200 , left side = 1.09179387225066e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.93110638614330e-1
n = 500 , left side = 4.31466685462656e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50677231900207e-1


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.74584607583582e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.63728772868914e-1
n = 20 , left side = 3.64476244509963e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.70642907085908e-1
n = 50 , left side = 1.87432347869744e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.90506259924017e-1
n = 100 , left side = 1.00426640476912e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41145979103267e-1
n = 200 , left side = 5.18624322432149e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98842334112515e-1
n = 500 , left side = 2.11367686205155e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52878221892782e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.59507066998702e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.41680166628570e-1
n = 20 , left side = 6.83222057511541e-2
```

```
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.38768325785750e-1
        n = 50 , left side = 2.39060133136003e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.85343481397391e-1
        n = 100 , left side = 1.13356305313164e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.39853012619642e-1
        n = 200 , left side = 5.50962710660396e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.98518950230233e-1
        n = 500 , left side = 2.16542465963676e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.52826474095197e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 5.35915223664589e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.47595711260813e-1
        n = 20 , left side = 1.39549631439949e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.93135568392910e-1
        n = 50 , left side = 2.25873553736422e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.06990759173628e-1
        n = 100 , left side = 5.65621421640405e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50623021729318e-1
        n = 200 , left side = 1.41464060785079e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03887113276052e-1
        n = 500 , left side = 2.26368809828070e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54969261873851e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 5.35766763324740e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.47610557294798e-1
        n = 20 , left side = 1.39549626935683e-2
                1/n^(3/10) = 4.07090531536904e-1
```

```
                 difference = 3.93135568843336e-1
        n = 50 , left side = 2.25873553736389e-3
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 3.06990759173628e-1
        n = 100 , left side = 5.65621421639961e-4
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.50623021729318e-1
        n = 200 , left side = 1.41464060785523e-4
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 2.03887113276051e-1
        n = 500 , left side = 2.26368809822519e-5
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.54969261873851e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$\sin(x)$

```
        n = 10 , left side = 8.16103412926577e-2
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 4.19576892334615e-1
        n = 20 , left side = 4.74002749691844e-2
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 3.59690256567720e-1
        n = 50 , left side = 2.04504182363461e-2
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 2.88799076474646e-1
        n = 100 , left side = 1.04642201544988e-2
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.40724422996459e-1
        n = 200 , left side = 5.29091086889000e-3
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 1.98737666467947e-1
        n = 500 , left side = 2.13035111268967e-3
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.52861547642144e-1
```

$\cos(x)$

```
        n = 10 , left side = 1.27068941688299e-1
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 3.74118291938974e-1
        n = 20 , left side = 5.89128294191317e-2
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 3.48177702117773e-1
```

```
n = 50 , left side = 2.22991398052110e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.86950354905781e-1
n = 100 , left side = 1.09266410803998e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.40262002070558e-1
n = 200 , left side = 5.40653113957668e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98622046197260e-1
n = 500 , left side = 2.14885103011964e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52843047724714e-1


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.55183748249535e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.65668858802319e-1
n = 20 , left side = 2.23494882434512e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.84741043293453e-1
n = 50 , left side = 1.00068068822887e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99242687828703e-1
n = 100 , left side = 5.17733962114941e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46011303529809e-1
n = 200 , left side = 2.63174260535315e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01396834731484e-1
n = 500 , left side = 1.06297961963886e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53928919135195e-1
```

$$\cos(x)$$

```
n = 10 , left side = 6.91205199526083e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.32066713674664e-1
n = 20 , left side = 3.08451099336924e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.76245421603212e-1
n = 50 , left side = 1.13704188189914e-2
```

```
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.97879075892000e-1
        n = 100 , left side = 5.51839709362201e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.45670246057336e-1
        n = 200 , left side = 2.71701663414470e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.01311560702692e-1
        n = 500 , left side = 1.07662389694030e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53915274857893e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.48212229160279e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.86366010711244e-1
        n = 20 , left side = 3.74474910286560e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.03345782434039e-1
        n = 50 , left side = 6.00948099493515e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08648546611498e-1
        n = 100 , left side = 1.50301118007068e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51038342032951e-1
        n = 200 , left side = 3.75792730706870e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03990998063766e-1
        n = 500 , left side = 6.01287285828533e-6
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54985885881975e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.48212218262009e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.86366011801071e-1
        n = 20 , left side = 3.74474868435526e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.03345782852549e-1
        n = 50 , left side = 6.00948269517176e-4
                1/n^(3/10) = 3.09249494710992e-1
```

```
                difference = 3.08648546441475e-1
        n = 100 , left side = 1.50301096831229e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51038342054127e-1
        n = 200 , left side = 3.75792935783936e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03990998043259e-1
        n = 500 , left side = 6.01285662871209e-6
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54985885898205e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 4.33415055859522e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.72886260430886e-1
        n = 20 , left side = 1.12552824142944e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.11053973607035e-1
        n = 50 , left side = 7.03650916520144e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 7.10562645852951e-2
        n = 100 , left side = 3.91179807146498e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 6.08820192853502e-2
        n = 200 , left side = 2.04958927091282e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 5.02147854095265e-2
        n = 500 , left side = 8.41628810006989e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 3.63050714499259e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 5.56661154693738e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = -2.40433388676900e-1
        n = 20 , left side = 2.77375170437838e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = -5.37683726878593e-2
        n = 50 , left side = 9.82534357579231e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 4.31679204793864e-2
```

```
n = 100 , left side = 4.61457320963173e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 5.38542679036827e-2
n = 200 , left side = 2.22563374688898e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.84543406497650e-2
n = 500 , left side = 8.69811669306420e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.60232428569316e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 4.00887404494789e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.76139025567359e-1
n = 20 , left side = 3.83928399692305e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.85213957780748e-1
n = 50 , left side = 3.21179292055399e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.09303427031770e-1
n = 100 , left side = 1.87795288000223e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.12204711999777e-2
n = 200 , left side = 1.00516285091354e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.06590496095193e-2
n = 500 , left side = 4.17660525040209e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.05447542995937e-2
```

$\cos(x)$

```
n = 10 , left side = 3.51696877135891e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = -3.54691111190527e-2
n = 20 , left side = 1.58815595821809e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.47912019281697e-2
n = 50 , left side = 5.23459570459724e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.90753991913371e-2
n = 100 , left side = 2.38718518518132e-2
```

```
                1/n^(1/2) = 1.00000000000000e-1
                difference = 7.61281481481868e-2
        n = 200 , left side = 1.13269333013363e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 5.93837448173185e-2
        n = 500 , left side = 4.38075384751768e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.03406057024781e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.77934495460432e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.38293270556406e-1
        n = 20 , left side = 5.27726087183127e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.70834189031666e-1
        n = 50 , left side = 8.83573450210706e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.32585621735202e-1
        n = 100 , left side = 2.22349166658886e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.77765083334111e-2
        n = 200 , left side = 5.56789565144489e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.01538885535103e-2
        n = 500 , left side = 8.91274745238313e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46322320754720e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.75729726788694e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.40498039228144e-1
        n = 20 , left side = 5.27555668114590e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.70851230938520e-1
        n = 50 , left side = 8.83573450054709e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.32585621736762e-1
        n = 100 , left side = 2.22349166658842e-3
                1/n^(1/2) = 1.00000000000000e-1
```

```
                difference = 9.77765083334116e-2
        n = 200 , left side = 5.56789565144933e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.01538885535098e-2
        n = 500 , left side = 8.91274745232762e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46322320754725e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$\sin(x)$

```
        n = 10 , left side = 1.11522468155106e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.04705297861732e-1
        n = 20 , left side = 8.25972655210491e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.41009532228930e-1
        n = 50 , left side = 3.90806697874810e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.02340686449828e-1
        n = 100 , left side = 2.04867976946519e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 7.95132023053481e-2
        n = 200 , left side = 1.04731898731506e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.02374882455042e-2
        n = 500 , left side = 4.24349700945814e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.04778625405377e-2
```

$\cos(x)$

```
        n = 10 , left side = 2.77923764210117e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 3.83040018067211e-2
        n = 20 , left side = 1.26343137611376e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = 9.72636601386025e-2
        n = 50 , left side = 4.61787798733720e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 9.52425763639375e-2
        n = 100 , left side = 2.22648980816018e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 7.77351019183982e-2
```

```
n = 200 , left side = 1.09179387225066e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.97927393961482e-2
n = 500 , left side = 4.31466685462656e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.04066926953692e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.74584607583582e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.78769305258480e-1
n = 20 , left side = 3.64476244509963e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.87159173298983e-1
n = 50 , left side = 1.87432347869744e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.22678121450335e-1
n = 100 , left side = 1.00426640476912e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.99573359523088e-2
n = 200 , left side = 5.18624322432149e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.55244348943333e-2
n = 500 , left side = 2.11367686205155e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.26076826879442e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.59507066998702e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.56720699018136e-1
n = 20 , left side = 6.83222057511541e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.55284591998825e-1
n = 50 , left side = 2.39060133136003e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.17515342923709e-1
n = 100 , left side = 1.13356305313164e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.86643694686836e-2
n = 200 , left side = 5.50962710660396e-3
```

```
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.52010510120508e-2
        n = 500 , left side = 2.16542465963676e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.25559348903590e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 5.35915223664589e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.62636243650379e-1
        n = 20 , left side = 1.39549631439949e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.09651834605984e-1
        n = 50 , left side = 2.25873553736422e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39162620699945e-1
        n = 100 , left side = 5.65621421640405e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.94343785783596e-2
        n = 200 , left side = 1.41464060785079e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05692140578697e-2
        n = 500 , left side = 2.26368809828070e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46987226690130e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 5.35766763324740e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.62651089684364e-1
        n = 20 , left side = 1.39549626935683e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.09651835056411e-1
        n = 50 , left side = 2.25873553736389e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39162620699946e-1
        n = 100 , left side = 5.65621421639961e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.94343785783600e-2
        n = 200 , left side = 1.41464060785523e-4
                1/n^(1/2) = 7.07106781186548e-2
```

```
                difference = 7.05692140578692e-2
        n = 500 , left side = 2.26368809822519e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46987226690135e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$\sin(x)$

```
        n = 10 , left side = 8.16103412926577e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.34617424724180e-1
        n = 20 , left side = 4.74002749691844e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.76206522780795e-1
        n = 50 , left side = 2.04504182363461e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.20970938000963e-1
        n = 100 , left side = 1.04642201544988e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.95357798455012e-2
        n = 200 , left side = 5.29091086889000e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.54197672497648e-2
        n = 500 , left side = 2.13035111268967e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.25910084373061e-2
```

$\cos(x)$

```
        n = 10 , left side = 1.27068941688299e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.89158824328539e-1
        n = 20 , left side = 5.89128294191317e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.64693968330847e-1
        n = 50 , left side = 2.22991398052110e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.19122216432098e-1
        n = 100 , left side = 1.09266410803998e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.90733589196002e-2
        n = 200 , left side = 5.40653113957668e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.53041469790781e-2
```

```
n = 500 , left side = 2.14885103011964e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.25725085198762e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 3.55183748249535e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.80709391191884e-1
n = 20 , left side = 2.23494882434512e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.01257309506528e-1
n = 50 , left side = 1.00068068822887e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31414549355021e-1
n = 100 , left side = 5.17733962114941e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.48226603788506e-2
n = 200 , left side = 2.63174260535315e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.80789355133016e-2
n = 500 , left side = 1.06297961963886e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.36583799303569e-2
```

$\cos(x)$

```
n = 10 , left side = 6.91205199526083e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.47107246064230e-1
n = 20 , left side = 3.08451099336924e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.92761687816287e-1
n = 50 , left side = 1.13704188189914e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.30050937418318e-1
n = 100 , left side = 5.51839709362201e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.44816029063780e-2
n = 200 , left side = 2.71701663414470e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.79936614845101e-2
n = 500 , left side = 1.07662389694030e-3
```

```
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.36447356530555e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 1.48212229160279e-2
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 3.01406543100810e-1
          n = 20 , left side = 3.74474910286560e-3
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 2.19862048647113e-1
          n = 50 , left side = 6.00948099493515e-4
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.40820408137816e-1
          n = 100 , left side = 1.50301118007068e-4
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.98496988819929e-2
          n = 200 , left side = 3.75792730706870e-5
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 7.06730988455841e-2
          n = 500 , left side = 6.01287285828533e-6
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.47153466771375e-2
```

$$\cos(x)$$

```
          n = 10 , left side = 1.48212218262009e-2
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 3.01406544190637e-1
          n = 20 , left side = 3.74474868435526e-3
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 2.19862049065624e-1
          n = 50 , left side = 6.00948269517176e-4
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.40820407967792e-1
          n = 100 , left side = 1.50301096831229e-4
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.98496989031688e-2
          n = 200 , left side = 3.75792935783936e-5
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 7.06730988250764e-2
          n = 500 , left side = 6.01285662871209e-6
                    1/n^(1/2) = 4.47213595499958e-2
```

```
                    difference = 4.47153466933671e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 4.33415055859522e-2
                    1/n^(7/10) = 1.99526231496888e-1
                    difference = 1.56184725910936e-1
          n = 20 , left side = 1.12552824142944e-1
                    1/n^(7/10) = 1.22822802611579e-1
                    difference = 1.02699784686346e-2
          n = 50 , left side = 7.03650916520144e-2
                    1/n^(7/10) = 6.46727006577358e-2
                    difference = -5.69239099427868e-3
          n = 100 , left side = 3.91179807146498e-2
                    1/n^(7/10) = 3.98107170553497e-2
                    difference = 6.92736340699954e-4
          n = 200 , left side = 2.04958927091282e-2
                    1/n^(7/10) = 2.45063709469745e-2
                    difference = 4.01047823784629e-3
          n = 500 , left side = 8.41628810006989e-3
                    1/n^(7/10) = 1.29039002429643e-2
                    difference = 4.48761214289443e-3
```

$$\cos(x)$$

```
          n = 10 , left side = 5.56661154693738e-1
                    1/n^(7/10) = 1.99526231496888e-1
                    difference = -3.57134923196850e-1
          n = 20 , left side = 2.77375170437838e-1
                    1/n^(7/10) = 1.22822802611579e-1
                    difference = -1.54552367826259e-1
          n = 50 , left side = 9.82534357579231e-2
                    1/n^(7/10) = 6.46727006577358e-2
                    difference = -3.35807351001874e-2
          n = 100 , left side = 4.61457320963173e-2
                    1/n^(7/10) = 3.98107170553497e-2
                    difference = -6.33501504096760e-3
          n = 200 , left side = 2.22563374688898e-2
                    1/n^(7/10) = 2.45063709469745e-2
                    difference = 2.25003347808473e-3
          n = 500 , left side = 8.69811669306420e-3
                    1/n^(7/10) = 1.29039002429643e-2
                    difference = 4.20578354990013e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.00887404494789e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.59437491047409e-1
n = 20 , left side = 3.83928399692305e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.44299626423486e-2
n = 50 , left side = 3.21179292055399e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.25547714521958e-2
n = 100 , left side = 1.87795288000223e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.10311882553274e-2
n = 200 , left side = 1.00516285091354e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.44547424378391e-2
n = 500 , left side = 4.17660525040209e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.72729499256224e-3
```

$$\cos(x)$$

```
n = 10 , left side = 3.51696877135891e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.52170645639003e-1
n = 20 , left side = 1.58815595821809e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.59927932102302e-2
n = 50 , left side = 5.23459570459724e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.23267436117633e-2
n = 100 , left side = 2.38718518518132e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.59388652035366e-2
n = 200 , left side = 1.13269333013363e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.31794376456382e-2
n = 500 , left side = 4.38075384751768e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.52314639544664e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.77934495460432e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.15917360364564e-2
n = 20 , left side = 5.27726087183127e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.00501938932664e-2
n = 50 , left side = 8.83573450210706e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.58369661556287e-2
n = 100 , left side = 2.22349166658886e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.75872253887609e-2
n = 200 , left side = 5.56789565144489e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39495813818300e-2
n = 500 , left side = 8.91274745238313e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28147727684405e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.75729726788694e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.37965047081943e-2
n = 20 , left side = 5.27555668114590e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.00672358001201e-2
n = 50 , left side = 8.83573450054709e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.58369661571887e-2
n = 100 , left side = 2.22349166658842e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.75872253887613e-2
n = 200 , left side = 5.56789565144933e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39495813818296e-2
n = 500 , left side = 8.91274745232762e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28147727684410e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.11522468155106e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.80037633417824e-2
n = 20 , left side = 8.25972655210491e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.02255370905300e-2
n = 50 , left side = 3.90806697874810e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.55920308702547e-2
n = 100 , left side = 2.04867976946519e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.93239193606978e-2
n = 200 , left side = 1.04731898731506e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.40331810738239e-2
n = 500 , left side = 4.24349700945814e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.66040323350618e-3
```

$$\cos(x)$$

```
n = 10 , left side = 2.77923764210117e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.83975327132288e-2
n = 20 , left side = 1.26343137611376e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.52033499979745e-3
n = 50 , left side = 4.61787798733720e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.84939207843637e-2
n = 100 , left side = 2.22648980816018e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.75458189737479e-2
n = 200 , left side = 1.09179387225066e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.35884322244679e-2
n = 500 , left side = 4.31466685462656e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.58923338833776e-3
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.74584607583582e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.62067770738530e-1
n = 20 , left side = 3.64476244509963e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.63751781605828e-2
n = 50 , left side = 1.87432347869744e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.59294658707614e-2
n = 100 , left side = 1.00426640476912e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.97680530076586e-2
n = 200 , left side = 5.18624322432149e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.93201277226530e-2
n = 500 , left side = 2.11367686205155e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07902233809128e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.59507066998702e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 4.00191644981857e-2
n = 20 , left side = 6.83222057511541e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.45005968604249e-2
n = 50 , left side = 2.39060133136003e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.07666873441354e-2
n = 100 , left side = 1.13356305313164e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.84750865240334e-2
n = 200 , left side = 5.50962710660396e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.89967438403705e-2
n = 500 , left side = 2.16542465963676e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07384755833276e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 5.35915223664589e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.45934709130429e-1
n = 20 , left side = 1.39549631439949e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.08867839467584e-1
n = 50 , left side = 2.25873553736422e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24139651203715e-2
n = 100 , left side = 5.65621421640405e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92450956337093e-2
n = 200 , left side = 1.41464060785079e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43649068861894e-2
n = 500 , left side = 2.26368809828070e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28812633619815e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.35766763324740e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.45949555164414e-1
n = 20 , left side = 1.39549626935683e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.08867839918011e-1
n = 50 , left side = 2.25873553736389e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24139651203719e-2
n = 100 , left side = 5.65621421639961e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92450956337098e-2
n = 200 , left side = 1.41464060785523e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43649068861890e-2
n = 500 , left side = 2.26368809822519e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28812633619821e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 8.16103412926577e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.17915890204230e-1
n = 20 , left side = 4.74002749691844e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.54225276423946e-2
n = 50 , left side = 2.04504182363461e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.42222824213897e-2
n = 100 , left side = 1.04642201544988e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.93464969008510e-2
n = 200 , left side = 5.29091086889000e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.92154600780845e-2
n = 500 , left side = 2.13035111268967e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07735491302747e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.27068941688299e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.24572898085893e-2
n = 20 , left side = 5.89128294191317e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.39099731924474e-2
n = 50 , left side = 2.22991398052110e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.23735608525247e-2
n = 100 , left side = 1.09266410803998e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.88840759749500e-2
n = 200 , left side = 5.40653113957668e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.90998398073978e-2
n = 500 , left side = 2.14885103011964e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07550492128447e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.55183748249535e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.64007856671935e-1
n = 20 , left side = 2.23494882434512e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.00473314368128e-1
n = 50 , left side = 1.00068068822887e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.46658937754470e-2
n = 100 , left side = 5.17733962114941e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.46333774342003e-2
n = 200 , left side = 2.63174260535315e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.18746283416214e-2
n = 500 , left side = 1.06297961963886e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.18409206233255e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.91205199526083e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.30405711544280e-1
n = 20 , left side = 3.08451099336924e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.19776926778867e-2
n = 50 , left side = 1.13704188189914e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.33022818387444e-2
n = 100 , left side = 5.51839709362201e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.42923199617277e-2
n = 200 , left side = 2.71701663414470e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.17893543128298e-2
n = 500 , left side = 1.07662389694030e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.18272763460240e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.48212229160279e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.84705008580860e-1
n = 20 , left side = 3.74474910286560e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19078053508713e-1
n = 50 , left side = 6.00948099493515e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.40717525582422e-2
n = 100 , left side = 1.50301118007068e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96604159373427e-2
n = 200 , left side = 3.75792730706870e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44687916739038e-2
n = 500 , left side = 6.01287285828533e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28978873701060e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.48212218262009e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.84705009670687e-1
n = 20 , left side = 3.74474868435526e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19078053927224e-1
n = 50 , left side = 6.00948269517176e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.40717523882186e-2
n = 100 , left side = 1.50301096831229e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96604159585185e-2
n = 200 , left side = 3.75792935783936e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44687916533961e-2
n = 500 , left side = 6.01285662871209e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28978873863356e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.14723251420851e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.39714908485187e-1
n = 20 , left side = 1.11294566010309e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.95795965526595e-1
n = 50 , left side = 6.57022757028689e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.43547219008123e-1
n = 100 , left side = 3.61332770545411e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.15055366096417e-1
n = 200 , left side = 1.88501016814122e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.85178475655425e-1
n = 500 , left side = 7.72268598453829e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.47269212770295e-1
```

$$\cos(x)$$

```
n = 10 , left side = 5.17973276214347e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = -1.67860425870751e-2
n = 20 , left side = 2.51295039601676e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.55795491935229e-1
n = 50 , left side = 8.91716716056311e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.20077823105361e-1
n = 100 , left side = 4.20399787268626e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.09148664424095e-1
n = 200 , left side = 2.03292531654993e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.83699324171338e-1
n = 500 , left side = 7.95946134048620e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.47032437414348e-1
```

```
-------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.25818738884073e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.78605359738865e-1
n = 20 , left side = 4.04453908761679e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.66645140660737e-1
n = 50 , left side = 3.02663846427299e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.78983110068262e-1
n = 100 , left side = 1.74104170545996e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.33778226096358e-1
n = 200 , left side = 9.25989196858368e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94768685368253e-1
n = 500 , left side = 3.83481978962941e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51157078965204e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.22248031460383e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 1.78939202166890e-1
n = 20 , left side = 1.42602604325762e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.64487927211142e-1
n = 50 , left side = 4.72897971848893e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.61959697526102e-1
n = 100 , left side = 2.16912390801810e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.29497404070777e-1
n = 200 , left side = 1.03316679895290e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.93696909347308e-1
n = 500 , left side = 4.00637442698604e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50985524327848e-1
```

```
-------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.55169425547731e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.46017808079542e-1
n = 20 , left side = 4.47376351803206e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62352896356584e-1
n = 50 , left side = 7.43627371125710e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01813220999735e-1
n = 100 , left side = 1.86936162198525e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49319281528973e-1
n = 200 , left side = 4.67987750302212e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03560589586535e-1
n = 500 , left side = 7.49070874974667e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54916991667336e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.53728257318856e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.47458976308417e-1
n = 20 , left side = 4.47310387031024e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62359492833802e-1
n = 50 , left side = 7.43627371112332e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01813220999868e-1
n = 100 , left side = 1.86936162198548e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49319281528973e-1
n = 200 , left side = 4.67987750301324e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03560589586536e-1
n = 500 , left side = 7.49070874980218e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54916991667336e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.10269377456684e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.90917856170588e-1
n = 20 , left side = 7.76237576737795e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.29466773863125e-1
n = 50 , left side = 3.60961153613112e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.73153379349681e-1
n = 100 , left side = 1.88410272392826e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.32347615911675e-1
n = 200 , left side = 9.61343382830926e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94415143508528e-1
n = 500 , left side = 3.89095422715491e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51100944527679e-1
```

$$\cos(x)$$

```
n = 10 , left side = 2.51869405006841e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.49317828620431e-1
n = 20 , left side = 1.14542456854608e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.92548074682297e-1
n = 50 , left side = 4.20732317898759e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.67176262921116e-1
n = 100 , left side = 2.03378378667143e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.30850805284244e-1
n = 200 , left side = 9.98779497231417e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94040782364523e-1
n = 500 , left side = 3.95085911348836e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51041039641345e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.95100600139320e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.61677173613340e-1
n = 20 , left side = 3.46988342396722e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72391697297232e-1
n = 50 , left side = 1.73741914965685e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.91875303214423e-1
n = 100 , left side = 9.25093740382399e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41937705747134e-1
n = 200 , left side = 4.76419447265497e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99264382864182e-1
n = 500 , left side = 1.93866173914414e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53053237015690e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.43310623580410e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.57876610046862e-1
n = 20 , left side = 6.16155530779090e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.45474978458995e-1
n = 50 , left side = 2.17255095716979e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.87523985139294e-1
n = 100 , left side = 1.03403776602994e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.40848265490659e-1
n = 200 , left side = 5.03665536910636e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98991921967731e-1
n = 500 , left side = 1.98226000171708e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53009638753117e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.55658979518569e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.55621335675415e-1
n = 20 , left side = 1.17886898348852e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95301841702019e-1
n = 50 , left side = 1.90462319911533e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07344871511876e-1
n = 100 , left side = 4.76820716817650e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50711822434140e-1
n = 200 , left side = 1.19246801639328e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909330535198e-1
n = 500 , left side = 1.90813536958823e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972817401138e-1
```

$$\cos(x)$$

```
n = 10 , left side = 4.55601836086841e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.55627050018588e-1
n = 20 , left side = 1.17886897702849e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95301841766620e-1
n = 50 , left side = 1.90462319911544e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07344871511876e-1
n = 100 , left side = 4.76820716817317e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50711822434141e-1
n = 200 , left side = 1.19246801639328e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909330535198e-1
n = 500 , left side = 1.90813536953272e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972817401138e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.66430508778089e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.24544182749463e-1
n = 20 , left side = 4.38693273663757e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.63221204170529e-1
n = 50 , left side = 1.88047297835469e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.90444764927445e-1
n = 100 , left side = 9.60447473250881e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41584168418449e-1
n = 200 , left side = 4.85201986681583e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99176557470021e-1
n = 500 , left side = 1.95265780521126e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53039240949622e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.15283010872480e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.85904222754793e-1
n = 20 , left side = 5.36357377250524e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.53454793811852e-1
n = 50 , left side = 2.03721756047669e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.88877319106225e-1
n = 100 , left side = 9.99650884011438e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41192134310844e-1
n = 200 , left side = 4.95003918172587e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99078538155111e-1
n = 500 , left side = 1.96834138039359e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53023557374440e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.37717704676066e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.67415463159666e-1
n = 20 , left side = 2.07753148869365e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86315216649968e-1
n = 50 , left side = 9.21511967883237e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.00034375032159e-1
n = 100 , left side = 4.75529633802130e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46433346812937e-1
n = 200 , left side = 2.41425898359438e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01614318353243e-1
n = 500 , left side = 9.74447341997808e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54017451412836e-1
```

$$\cos(x)$$

```
n = 10 , left side = 6.24222476166083e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.38764986010664e-1
n = 20 , left side = 2.80065121964509e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.79084019340454e-1
n = 50 , left side = 1.03752156077472e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.98874279103244e-1
n = 100 , left side = 5.04543146629355e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46143211684664e-1
n = 200 , left side = 2.48679971416943e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01541777622668e-1
n = 500 , left side = 9.86054169944905e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54005844584889e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.26576588370481e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.88529574790224e-1
n = 20 , left side = 3.19289527212951e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03897636264775e-1
n = 50 , left side = 5.12151444058584e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08737343266933e-1
n = 100 , left side = 1.28084179052301e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060558971906e-1
n = 200 , left side = 3.20238618123359e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996553475025e-1
n = 500 , left side = 5.12400106766897e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986774753766e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.26576548275704e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.88529578799702e-1
n = 20 , left side = 3.19289294996850e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03897638586936e-1
n = 50 , left side = 5.12152389308462e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08737342321683e-1
n = 100 , left side = 1.28084061290501e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060559089668e-1
n = 200 , left side = 3.20239758674346e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996553360970e-1
n = 500 , left side = 5.12391080287333e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986774844031e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.14723251420851e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.54755440874753e-1
n = 20 , left side = 1.11294566010309e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.12312231739670e-1
n = 50 , left side = 6.57022757028689e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.57190805344406e-2
n = 100 , left side = 3.61332770545411e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.38667229454589e-2
n = 200 , left side = 1.88501016814122e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.18605764372425e-2
n = 500 , left side = 7.72268598453829e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.69986735654575e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.17973276214347e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = -2.01745510197509e-1
n = 20 , left side = 2.51295039601676e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.76882418516968e-2
n = 50 , left side = 8.91716716056311e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 5.22496846316784e-2
n = 100 , left side = 4.20399787268626e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 5.79600212731374e-2
n = 200 , left side = 2.03292531654993e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.03814249531555e-2
n = 500 , left side = 7.95946134048620e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.67618982095096e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.25818738884073e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.93645892128431e-1
n = 20 , left side = 4.04453908761679e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.83161406873811e-1
n = 50 , left side = 3.02663846427299e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11154971594580e-1
n = 100 , left side = 1.74104170545996e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.25895829454004e-2
n = 200 , left side = 9.25989196858368e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.14507861500711e-2
n = 500 , left side = 3.83481978962941e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.08865397603664e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.22248031460383e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = -6.02026544354467e-3
n = 20 , left side = 1.42602604325762e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.10041934242170e-2
n = 50 , left side = 4.72897971848893e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.41315590524202e-2
n = 100 , left side = 2.16912390801810e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.83087609198190e-2
n = 200 , left side = 1.03316679895290e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.03790101291257e-2
n = 500 , left side = 4.00637442698604e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.07149851230098e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.55169425547731e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.61058340469107e-1
n = 20 , left side = 4.47376351803206e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78869162569658e-1
n = 50 , left side = 7.43627371125710e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33985082526052e-1
n = 100 , left side = 1.86936162198525e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.81306383780148e-2
n = 200 , left side = 4.67987750302212e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02426903683525e-2
n = 500 , left side = 7.49070874974667e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46464524624983e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.53728257318856e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.62499508697982e-1
n = 20 , left side = 4.47310387031024e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78875759046877e-1
n = 50 , left side = 7.43627371112332e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33985082526186e-1
n = 100 , left side = 1.86936162198548e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.81306383780145e-2
n = 200 , left side = 4.67987750301324e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02426903683534e-2
n = 500 , left side = 7.49070874980218e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46464524624978e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.10269377456684e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.05958388560154e-1
n = 20 , left side = 7.76237576737795e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.45983040076199e-1
n = 50 , left side = 3.60961153613112e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.05325240875998e-1
n = 100 , left side = 1.88410272392826e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.11589727607174e-2
n = 200 , left side = 9.61343382830926e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.10972442903455e-2
n = 500 , left side = 3.89095422715491e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.08304053228409e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.51869405006841e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 6.43583610099968e-2
n = 20 , left side = 1.14542456854608e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.09064340895371e-1
n = 50 , left side = 4.20732317898759e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.93481244474336e-2
n = 100 , left side = 2.03378378667143e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.96621621332857e-2
n = 200 , left side = 9.98779497231417e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.07228831463406e-2
n = 500 , left side = 3.95085911348836e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.07705004365074e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.95100600139320e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.76717706002906e-1
n = 20 , left side = 3.46988342396722e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88907963510307e-1
n = 50 , left side = 1.73741914965685e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24047164740741e-1
n = 100 , left side = 9.25093740382399e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.07490625961760e-2
n = 200 , left side = 4.76419447265497e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.59464836459998e-2
n = 500 , left side = 1.93866173914414e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27826978108517e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.43310623580410e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.72917142436428e-1
n = 20 , left side = 6.16155530779090e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.61991244672070e-1
n = 50 , left side = 2.17255095716979e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.19695846665612e-1
n = 100 , left side = 1.03403776602994e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.96596223397006e-2
n = 200 , left side = 5.03665536910636e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.56740227495484e-2
n = 500 , left side = 1.98226000171708e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27390995482787e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.55658979518569e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.70661868064981e-1
n = 20 , left side = 1.17886898348852e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.11818107915094e-1
n = 50 , left side = 1.90462319911533e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39516733038194e-1
n = 100 , left side = 4.76820716817650e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95231792831824e-2
n = 200 , left side = 1.19246801639328e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05914313170154e-2
n = 500 , left side = 1.90813536958823e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47022781962999e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.55601836086841e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.70667582408154e-1
n = 20 , left side = 1.17886897702849e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.11818107979694e-1
n = 50 , left side = 1.90462319911544e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39516733038194e-1
n = 100 , left side = 4.76820716817317e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95231792831827e-2
n = 200 , left side = 1.19246801639328e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05914313170154e-2
n = 500 , left side = 1.90813536953272e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47022781963005e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.66430508778089e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.39584715139029e-1
n = 20 , left side = 4.38693273663757e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.79737470383603e-1
n = 50 , left side = 1.88047297835469e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.22616626453763e-1
n = 100 , left side = 9.60447473250881e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.03955252674912e-2
n = 200 , left side = 4.85201986681583e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.58586582518389e-2
n = 500 , left side = 1.95265780521126e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27687017447845e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.15283010872480e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.00944755144358e-1
n = 20 , left side = 5.36357377250524e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.69971060024927e-1
n = 50 , left side = 2.03721756047669e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21049180632543e-1
n = 100 , left side = 9.99650884011438e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.00034911598856e-2
n = 200 , left side = 4.95003918172587e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.57606389369289e-2
n = 500 , left side = 1.96834138039359e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27530181696022e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.37717704676066e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.82455995549231e-1
n = 20 , left side = 2.07753148869365e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.02831482863042e-1
n = 50 , left side = 9.21511967883237e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.32206236558477e-1
n = 100 , left side = 4.75529633802130e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.52447036619787e-2
n = 200 , left side = 2.41425898359438e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82964191350604e-2
n = 500 , left side = 9.74447341997808e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37469122079980e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.24222476166083e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.53805518400230e-1
n = 20 , left side = 2.80065121964509e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.95600285553528e-1
n = 50 , left side = 1.03752156077472e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31046140629562e-1
n = 100 , left side = 5.04543146629355e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.49545685337065e-2
n = 200 , left side = 2.48679971416943e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82238784044853e-2
n = 500 , left side = 9.86054169944905e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37353053800509e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.26576588370481e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.03570107179790e-1
n = 20 , left side = 3.19289527212951e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20413902477849e-1
n = 50 , left side = 5.12151444058584e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40909204793251e-1
n = 100 , left side = 1.28084179052301e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719158209477e-2
n = 200 , left side = 3.20238618123359e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06786542568424e-2
n = 500 , left side = 5.12400106766897e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162355489281e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.26576548275704e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.03570111189268e-1
n = 20 , left side = 3.19289294996850e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20413904800010e-1
n = 50 , left side = 5.12152389308462e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40909203848001e-1
n = 100 , left side = 1.28084061290501e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719159387095e-2
n = 200 , left side = 3.20239758674346e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06786541427873e-2
n = 500 , left side = 5.12391080287333e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162356391929e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.14723251420851e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.38053906354803e-1
n = 20 , left side = 1.11294566010309e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.15282366012696e-2
n = 50 , left side = 6.57022757028689e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.02957504513315e-3
n = 100 , left side = 3.61332770545411e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.67744000080868e-3
n = 200 , left side = 1.88501016814122e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 5.65626926556229e-3
n = 500 , left side = 7.72268598453829e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 5.18121425842603e-3
```

$$\cos(x)$$

```
n = 10 , left side = 5.17973276214347e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -3.18447044717459e-1
n = 20 , left side = 2.51295039601676e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.28472236990097e-1
n = 50 , left side = 8.91716716056311e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -2.44989709478954e-2
n = 100 , left side = 4.20399787268626e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.22926167151287e-3
n = 200 , left side = 2.03292531654993e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 4.17711778147523e-3
n = 500 , left side = 7.95946134048620e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 4.94443890247813e-3
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.25818738884073e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.76944357608481e-1
n = 20 , left side = 4.04453908761679e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.23774117354111e-2
n = 50 , left side = 3.02663846427299e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.44063160150059e-2
n = 100 , left side = 1.74104170545996e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.24003000007502e-2
n = 200 , left side = 9.25989196858368e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.52464789783908e-2
n = 500 , left side = 3.83481978962941e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.06908045333492e-3
```

$$\cos(x)$$

```
n = 10 , left side = 3.22248031460383e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.22721799963495e-1
n = 20 , left side = 1.42602604325762e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.97798017141829e-2
n = 50 , left side = 4.72897971848893e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.73829034728464e-2
n = 100 , left side = 2.16912390801810e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.81194779751687e-2
n = 200 , left side = 1.03316679895290e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.41747029574455e-2
n = 500 , left side = 4.00637442698604e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.89752581597829e-3
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.55169425547731e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 4.43568059491574e-2
n = 20 , left side = 4.47376351803206e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.80851674312585e-2
n = 50 , left side = 7.43627371125710e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.72364269464787e-2
n = 100 , left side = 1.86936162198525e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.79413554333645e-2
n = 200 , left side = 4.67987750302212e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40383831966723e-2
n = 500 , left side = 7.49070874974667e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28289931554669e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.53728257318856e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 4.57979741780322e-2
n = 20 , left side = 4.47310387031024e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.80917639084767e-2
n = 50 , left side = 7.43627371112332e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.72364269466124e-2
n = 100 , left side = 1.86936162198548e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.79413554333643e-2
n = 200 , left side = 4.67987750301324e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40383831966732e-2
n = 500 , left side = 7.49070874980218e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28289931554663e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.10269377456684e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.92568540402040e-2
n = 20 , left side = 7.76237576737795e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.51990449377996e-2
n = 50 , left side = 3.60961153613112e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.85765852964246e-2
n = 100 , left side = 1.88410272392826e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.09696898160671e-2
n = 200 , left side = 9.61343382830926e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.48929371186652e-2
n = 500 , left side = 3.89095422715491e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.01294601580942e-3
```

$$\cos(x)$$

```
n = 10 , left side = 2.51869405006841e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -5.23431735099532e-2
n = 20 , left side = 1.14542456854608e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.28034575697131e-3
n = 50 , left side = 4.20732317898759e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.25994688678599e-2
n = 100 , left side = 2.03378378667143e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.94728791886355e-2
n = 200 , left side = 9.98779497231417e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.45185759746603e-2
n = 500 , left side = 3.95085911348836e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.95304112947596e-3
```

```
-------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.95100600139320e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.60016171482956e-1
n = 20 , left side = 3.46988342396722e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.81239683719068e-2
n = 50 , left side = 1.73741914965685e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.72985091611673e-2
n = 100 , left side = 9.25093740382399e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.05597796515257e-2
n = 200 , left side = 4.76419447265497e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.97421764743195e-2
n = 500 , left side = 1.93866173914414e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09652385038202e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.43310623580410e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.62156079164780e-2
n = 20 , left side = 6.16155530779090e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.12072495336700e-2
n = 50 , left side = 2.17255095716979e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.29471910860378e-2
n = 100 , left side = 1.03403776602994e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.94703393950504e-2
n = 200 , left side = 5.03665536910636e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.94697155778681e-2
n = 500 , left side = 1.98226000171708e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09216402412472e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.55658979518569e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.53960333545031e-1
n = 20 , left side = 1.17886898348852e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11034112776694e-1
n = 50 , left side = 1.90462319911533e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.27680774586204e-2
n = 100 , left side = 4.76820716817650e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93338963385321e-2
n = 200 , left side = 1.19246801639328e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43871241453352e-2
n = 500 , left side = 1.90813536958823e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848188892684e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.55601836086841e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.53966047888204e-1
n = 20 , left side = 1.17886897702849e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11034112841294e-1
n = 50 , left side = 1.90462319911544e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.27680774586203e-2
n = 100 , left side = 4.76820716817317e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93338963385324e-2
n = 200 , left side = 1.19246801639328e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43871241453352e-2
n = 500 , left side = 1.90813536953272e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848188892690e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.66430508778089e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.22883180619079e-1
n = 20 , left side = 4.38693273663757e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.89534752452033e-2
n = 50 , left side = 1.88047297835469e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.58679708741889e-2
n = 100 , left side = 9.60447473250881e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.02062423228409e-2
n = 200 , left side = 4.85201986681583e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.96543510801587e-2
n = 500 , left side = 1.95265780521126e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09512424377531e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.15283010872480e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.42432206244082e-2
n = 20 , left side = 5.36357377250524e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.91870648865267e-2
n = 50 , left side = 2.03721756047669e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.43005250529689e-2
n = 100 , left side = 9.99650884011438e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.98142082152354e-2
n = 200 , left side = 4.95003918172587e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.95563317652486e-2
n = 500 , left side = 1.96834138039359e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09355588625707e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 3.37717704676066e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.65754461029281e-1
n = 20 , left side = 2.07753148869365e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02047487724643e-1
n = 50 , left side = 9.21511967883237e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.54575809789034e-2
n = 100 , left side = 4.75529633802130e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.50554207173284e-2
n = 200 , left side = 2.41425898359438e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20921119633801e-2
n = 500 , left side = 9.74447341997808e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19294529009665e-2
```

$\cos(x)$

```
n = 10 , left side = 6.24222476166083e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.37103983880280e-1
n = 20 , left side = 2.80065121964509e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.48162904151282e-2
n = 50 , left side = 1.03752156077472e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.42974850499885e-2
n = 100 , left side = 5.04543146629355e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.47652855890562e-2
n = 200 , left side = 2.48679971416943e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20195712328051e-2
n = 500 , left side = 9.86054169944905e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19178460730194e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.26576588370481e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.86868572659840e-1
n = 20 , left side = 3.19289527212951e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19629907339450e-1
n = 50 , left side = 5.12151444058584e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41605492136772e-2
n = 100 , left side = 1.28084179052301e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826328762974e-2
n = 200 , left side = 3.20238618123359e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44743470851622e-2
n = 500 , left side = 5.12400106766897e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987762418967e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.26576548275704e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.86868576669318e-1
n = 20 , left side = 3.19289294996850e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19629909661611e-1
n = 50 , left side = 5.12152389308462e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41605482684273e-2
n = 100 , left side = 1.28084061290501e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826329940592e-2
n = 200 , left side = 3.20239758674346e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44743469711071e-2
n = 500 , left side = 5.12391080287333e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987763321615e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.78098164088962e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.23377417218376e-1
n = 20 , left side = 1.08616092155934e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.98474439380971e-1
n = 50 , left side = 6.08924439088147e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.48357050802177e-1
n = 100 , left side = 3.31474475479987e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.18041195602959e-1
n = 200 , left side = 1.72203677813659e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.86808209555471e-1
n = 500 , left side = 7.03923603518941e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.47952662719644e-1
```

$$\cos(x)$$

```
n = 10 , left side = 4.76056506425614e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.51307272016588e-2
n = 20 , left side = 2.25829647387306e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.81260884149599e-1
n = 50 , left side = 8.03833075671950e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.28866187143797e-1
n = 100 , left side = 3.80472608774318e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.13141382273526e-1
n = 200 , left side = 1.84470241316033e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.85581553205234e-1
n = 500 , left side = 7.23557745516012e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.47756321299674e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.48313112815513e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.94704102499117e-1
n = 20 , left side = 4.15574871466176e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.65533044390287e-1
n = 50 , left side = 2.82943012151045e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.80955193495887e-1
n = 100 , left side = 1.60283302837170e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.35160312867241e-1
n = 200 , left side = 8.47301362022967e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.95555563716607e-1
n = 500 , left side = 3.49759750811796e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51494301246716e-1
```

$$\cos(x)$$

```
n = 10 , left side = 2.91647680292074e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.09539553335199e-1
n = 20 , left side = 1.27004750872073e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.80085780664831e-1
n = 50 , left side = 4.24336508924082e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.66815843818583e-1
n = 100 , left side = 1.95803631962795e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.31608279954678e-1
n = 200 , left side = 9.36210225072587e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94666475086111e-1
n = 500 , left side = 3.63990015656057e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51351998598273e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.33090607945874e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.68096625681398e-1
n = 20 , left side = 3.74032243667267e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69687307170178e-1
n = 50 , left side = 6.17699792274040e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03072496788251e-1
n = 100 , left side = 1.55133868906343e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49637304461895e-1
n = 200 , left side = 3.88280042364686e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03640297294472e-1
n = 500 , left side = 6.21447858150104e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54929753969019e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.32228903518068e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.68958330109205e-1
n = 20 , left side = 3.74010816053945e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69689449931510e-1
n = 50 , left side = 6.17699792273274e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03072496788259e-1
n = 100 , left side = 1.55133868906299e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49637304461895e-1
n = 200 , left side = 3.88280042364797e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03640297294472e-1
n = 500 , left side = 6.21447858143442e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54929753969019e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 1.07595843273687e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.93591390353586e-1
n = 20 , left side = 7.23719591814265e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.34718572355478e-1
n = 50 , left side = 3.31104351449998e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.76139059565992e-1
n = 100 , left side = 1.72113137108668e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.33977329440091e-1
n = 200 , left side = 8.76560970353735e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.95262967633300e-1
n = 500 , left side = 3.54408471378442e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51447814041049e-1
```

$\cos(x)$

```
n = 10 , left side = 2.26432743288439e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.74754490338833e-1
n = 20 , left side = 1.03132838027183e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.03957693509722e-1
n = 50 , left side = 3.80807135746732e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.71168781136318e-1
n = 100 , left side = 1.84556323606327e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.32733010790325e-1
n = 200 , left side = 9.07679883426815e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94951778502569e-1
n = 500 , left side = 3.59387988063964e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51398018874194e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.06214846560657e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.60565748971207e-1
n = 20 , left side = 3.27397928461644e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.74350738690740e-1
n = 50 , left side = 1.59921738294495e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.93257320881542e-1
n = 100 , left side = 8.46406889142892e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.42724574259529e-1
n = 200 , left side = 4.34731167188107e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99681265664956e-1
n = 500 , left side = 1.76635459016661e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53225544164667e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.27730593967490e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.73456639659783e-1
n = 20 , left side = 5.51875549415474e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.51902976595357e-1
n = 50 , left side = 1.96147392307107e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.89634755480281e-1
n = 100 , left side = 9.37082404104206e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41817819109916e-1
n = 200 , left side = 4.57407016420697e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99454507172630e-1
n = 500 , left side = 1.80263907278089e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53189259682053e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.82403413599863e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.62946892267286e-1
n = 20 , left side = 9.83652130757806e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.97254010229326e-1
n = 50 , left side = 1.58661616720768e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07662878543784e-1
n = 100 , left side = 3.97114005224797e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50791529145733e-1
n = 200 , left side = 9.93072863738620e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03929270050463e-1
n = 500 , left side = 1.58904558200668e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54976008299014e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.82384972730299e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.62948736354242e-1
n = 20 , left side = 9.83652130103407e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.97254010235870e-1
n = 50 , left side = 1.58661616720779e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07662878543784e-1
n = 100 , left side = 3.97114005224797e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50791529145733e-1
n = 200 , left side = 9.93072863736399e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03929270050463e-1
n = 500 , left side = 1.58904558195117e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54976008299014e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.13978182742472e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.29789415353025e-1
n = 20 , left side = 4.03151330528322e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.66775398484072e-1
n = 50 , left side = 1.71750977616711e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.92074396949321e-1
n = 100 , left side = 8.75666011423792e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.42431983036720e-1
n = 200 , left side = 4.42003576816363e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99608541568673e-1
n = 500 , left side = 1.77794791952646e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53213950835307e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.03887660411088e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.97299573216185e-1
n = 20 , left side = 4.85125066566302e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.58578024880274e-1
n = 50 , left side = 1.84900639739718e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.90759430737020e-1
n = 100 , left side = 9.08552298058340e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.42103120170375e-1
n = 200 , left side = 4.50225906379942e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99526318273038e-1
n = 500 , left side = 1.79110398947746e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53200794765356e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.18151823405496e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.69372051286723e-1
n = 20 , left side = 1.91703714608062e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.87920160076098e-1
n = 50 , left side = 8.42828905865911e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.00821205652333e-1
n = 100 , left side = 4.33841960820092e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46850223542757e-1
n = 200 , left side = 2.20002731784108e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01828550018996e-1
n = 500 , left side = 8.87374774796945e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54104523980037e-1
```

$$\cos(x)$$

```
n = 10 , left side = 5.60022821222895e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.45184951504983e-1
n = 20 , left side = 2.52655696431278e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.81824961893777e-1
n = 50 , left side = 9.40570915874672e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99843785552245e-1
n = 100 , left side = 4.58285294763516e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46605790203323e-1
n = 200 , left side = 2.26114052848370e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01767436808353e-1
n = 500 , left side = 8.97153108372684e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54094745646461e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.07079403100766e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.90479293317196e-1
n = 20 , left side = 2.69712692001400e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.04393404616890e-1
n = 50 , left side = 4.32446646589146e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08817048064403e-1
n = 100 , left side = 1.08145141316629e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51080498009641e-1
n = 200 , left side = 2.70379538864773e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04001539382950e-1
n = 500 , left side = 4.32645256465136e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54987572302269e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.07079192966729e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.90479314330599e-1
n = 20 , left side = 2.69711451429500e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.04393417022609e-1
n = 50 , left side = 4.32451705315695e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08817043005676e-1
n = 100 , left side = 1.08144510928221e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51080498640030e-1
n = 200 , left side = 2.70385644706161e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04001538772366e-1
n = 500 , left side = 4.32596932953278e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54987572785504e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.78098164088962e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.38417949607942e-1
n = 20 , left side = 1.08616092155934e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.14990705594045e-1
n = 50 , left side = 6.08924439088147e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.05289123284949e-2
n = 100 , left side = 3.31474475479987e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.68525524520013e-2
n = 200 , left side = 1.72203677813659e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.34903103372888e-2
n = 500 , left side = 7.03923603518941e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.76821235148064e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.76056506425614e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = -1.59828740408776e-1
n = 20 , left side = 2.25829647387306e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.22284963732691e-3
n = 50 , left side = 8.03833075671950e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.10380486701145e-2
n = 100 , left side = 3.80472608774318e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.19527391225682e-2
n = 200 , left side = 1.84470241316033e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.22636539870515e-2
n = 500 , left side = 7.23557745516012e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.74857820948357e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.48313112815513e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.09744634888683e-1
n = 20 , left side = 4.15574871466176e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.82049310603361e-1
n = 50 , left side = 2.82943012151045e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13127055022205e-1
n = 100 , left side = 1.60283302837170e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.39716697162830e-2
n = 200 , left side = 8.47301362022967e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.22376644984251e-2
n = 500 , left side = 3.49759750811796e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.12237620418778e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.91647680292074e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.45800857247643e-2
n = 20 , left side = 1.27004750872073e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 9.66020468779057e-2
n = 50 , left side = 4.24336508924082e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.89877053449013e-2
n = 100 , left side = 1.95803631962795e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.04196368037205e-2
n = 200 , left side = 9.36210225072587e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.13485758679289e-2
n = 500 , left side = 3.63990015656057e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.10814593934352e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.33090607945874e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.83137158070963e-1
n = 20 , left side = 3.74032243667267e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.86203573383252e-1
n = 50 , left side = 6.17699792274040e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.35244358314569e-1
n = 100 , left side = 1.55133868906343e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.84486613109366e-2
n = 200 , left side = 3.88280042364686e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03223980762901e-2
n = 500 , left side = 6.21447858150104e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46592147641808e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.32228903518068e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.83998862498770e-1
n = 20 , left side = 3.74010816053945e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.86205716144585e-1
n = 50 , left side = 6.17699792273274e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.35244358314577e-1
n = 100 , left side = 1.55133868906299e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.84486613109370e-2
n = 200 , left side = 3.88280042364797e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03223980762900e-2
n = 500 , left side = 6.21447858143442e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46592147641814e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.07595843273687e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.08631922743151e-1
n = 20 , left side = 7.23719591814265e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.51234838568552e-1
n = 50 , left side = 3.31104351449998e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.08310921092310e-1
n = 100 , left side = 1.72113137108668e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.27886862891332e-2
n = 200 , left side = 8.76560970353735e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.19450684151174e-2
n = 500 , left side = 3.54408471378442e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.11772748362114e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.26432743288439e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 8.97950227283990e-2
n = 20 , left side = 1.03132838027183e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.20473959722796e-1
n = 50 , left side = 3.80807135746732e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.03340642662636e-1
n = 100 , left side = 1.84556323606327e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.15443676393673e-2
n = 200 , left side = 9.07679883426815e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.16338792843866e-2
n = 500 , left side = 3.59387988063964e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.11274796693562e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.06214846560657e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.75606281360772e-1
n = 20 , left side = 3.27397928461644e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.90867004903815e-1
n = 50 , left side = 1.59921738294495e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.25429182407860e-1
n = 100 , left side = 8.46406889142892e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.15359311085711e-2
n = 200 , left side = 4.34731167188107e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.63633664467737e-2
n = 500 , left side = 1.76635459016661e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.29550049598292e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.27730593967490e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.88497172049348e-1
n = 20 , left side = 5.51875549415474e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.68419242808432e-1
n = 50 , left side = 1.96147392307107e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21806617006599e-1
n = 100 , left side = 9.37082404104206e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.06291759589579e-2
n = 200 , left side = 4.57407016420697e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.61366079544478e-2
n = 500 , left side = 1.80263907278089e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.29187204772149e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.82403413599863e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.77987424656852e-1
n = 20 , left side = 9.83652130757806e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.13770276442401e-1
n = 50 , left side = 1.58661616720768e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39834740070102e-1
n = 100 , left side = 3.97114005224797e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96028859947752e-2
n = 200 , left side = 9.93072863738620e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06113708322809e-2
n = 500 , left side = 1.58904558200668e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47054690941757e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.82384972730299e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.77989268743808e-1
n = 20 , left side = 9.83652130103407e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.13770276448945e-1
n = 50 , left side = 1.58661616720779e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39834740070102e-1
n = 100 , left side = 3.97114005224797e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96028859947752e-2
n = 200 , left side = 9.93072863736399e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06113708322811e-2
n = 500 , left side = 1.58904558195117e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47054690941763e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.13978182742472e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.44829947742591e-1
n = 20 , left side = 4.03151330528322e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.83291664697147e-1
n = 50 , left side = 1.71750977616711e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24246258475638e-1
n = 100 , left side = 8.75666011423792e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.12433398857621e-2
n = 200 , left side = 4.42003576816363e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.62906423504911e-2
n = 500 , left side = 1.77794791952646e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.29434116304693e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.03887660411088e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.12340105605750e-1
n = 20 , left side = 4.85125066566302e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.75094291093349e-1
n = 50 , left side = 1.84900639739718e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.22931292263338e-1
n = 100 , left side = 9.08552298058340e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.09144770194166e-2
n = 200 , left side = 4.50225906379942e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.62084190548553e-2
n = 500 , left side = 1.79110398947746e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.29302555605183e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.18151823405496e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.84412583676288e-1
n = 20 , left side = 1.91703714608062e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.04436426289173e-1
n = 50 , left side = 8.42828905865911e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.32993067178650e-1
n = 100 , left side = 4.33841960820092e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.56615803917991e-2
n = 200 , left side = 2.20002731784108e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.85106508008137e-2
n = 500 , left side = 8.87374774796945e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.38339847751988e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.60022821222895e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.60225483894548e-1
n = 20 , left side = 2.52655696431278e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.98341228106851e-1
n = 50 , left side = 9.40570915874672e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.32015647078563e-1
n = 100 , left side = 4.58285294763516e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.54171470523648e-2
n = 200 , left side = 2.26114052848370e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.84495375901711e-2
n = 500 , left side = 8.97153108372684e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.38242064416231e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.07079403100766e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.05519825706761e-1
n = 20 , left side = 2.69712692001400e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20909670829965e-1
n = 50 , left side = 4.32446646589146e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40988909590720e-1
n = 100 , left side = 1.08145141316629e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98918548586834e-2
n = 200 , left side = 2.70379538864773e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06836401647683e-2
n = 500 , left side = 4.32645256465136e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47170330974311e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.07079192966729e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.05519846720165e-1
n = 20 , left side = 2.69711451429500e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20909683235684e-1
n = 50 , left side = 4.32451705315695e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40988904531994e-1
n = 100 , left side = 1.08144510928221e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98918554890718e-2
n = 200 , left side = 2.70385644706161e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06836395541841e-2
n = 500 , left side = 4.32596932953278e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47170335806663e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.78098164088962e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.21716415087992e-1
n = 20 , left side = 1.08616092155934e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.42067104556454e-2
n = 50 , left side = 6.08924439088147e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.78025674892110e-3
n = 100 , left side = 3.31474475479987e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 6.66326950735104e-3
n = 200 , left side = 1.72203677813659e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 7.28600316560857e-3
n = 500 , left side = 7.03923603518941e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 5.86466420777491e-3
```

$$\cos(x)$$

```
n = 10 , left side = 4.76056506425614e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -2.76530274928726e-1
n = 20 , left side = 2.25829647387306e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.03006844775727e-1
n = 50 , left side = 8.03833075671950e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.57106069094593e-2
n = 100 , left side = 3.80472608774318e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.76345617791791e-3
n = 200 , left side = 1.84470241316033e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 6.05934681537124e-3
n = 500 , left side = 7.23557745516012e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 5.66832278780420e-3
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.48313112815513e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.93043100368733e-1
n = 20 , left side = 4.15574871466176e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.12653154649615e-2
n = 50 , left side = 2.82943012151045e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.63783994426313e-2
n = 100 , left side = 1.60283302837170e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.37823867716328e-2
n = 200 , left side = 8.47301362022967e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.60333573267448e-2
n = 500 , left side = 3.49759750811796e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.40630273484637e-3
```

$$\cos(x)$$

```
n = 10 , left side = 2.91647680292074e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -9.21214487951857e-2
n = 20 , left side = 1.27004750872073e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -4.18194826049426e-3
n = 50 , left side = 4.24336508924082e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.22390497653275e-2
n = 100 , left side = 1.95803631962795e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.02303538590702e-2
n = 200 , left side = 9.36210225072587e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.51442686962486e-2
n = 500 , left side = 3.63990015656057e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.26400008640375e-3
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.33090607945874e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.64356235510135e-2
n = 20 , left side = 3.74032243667267e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.54195782448523e-2
n = 50 , left side = 6.17699792274040e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.84957027349954e-2
n = 100 , left side = 1.55133868906343e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.82593783662863e-2
n = 200 , left side = 3.88280042364686e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41180909046098e-2
n = 500 , left side = 6.21447858150104e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28417554571493e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.32228903518068e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.72973279788204e-2
n = 20 , left side = 3.74010816053945e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.54217210061846e-2
n = 50 , left side = 6.17699792273274e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.84957027350030e-2
n = 100 , left side = 1.55133868906299e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.82593783662867e-2
n = 200 , left side = 3.88280042364797e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41180909046097e-2
n = 500 , left side = 6.21447858143442e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28417554571500e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 1.07595843273687e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.19303882232013e-2
n = 20 , left side = 7.23719591814265e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.04508434301526e-2
n = 50 , left side = 3.31104351449998e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.15622655127360e-2
n = 100 , left side = 1.72113137108668e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.25994033444829e-2
n = 200 , left side = 8.76560970353735e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.57407612434372e-2
n = 500 , left side = 3.54408471378442e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.35981552917990e-3
```

$\cos(x)$

```
n = 10 , left side = 2.26432743288439e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -2.69065117915509e-2
n = 20 , left side = 1.03132838027183e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.96899645843962e-2
n = 50 , left side = 3.80807135746732e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.65919870830625e-2
n = 100 , left side = 1.84556323606327e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.13550846947170e-2
n = 200 , left side = 9.07679883426815e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.54295721127064e-2
n = 500 , left side = 3.59387988063964e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.31002036232468e-3
```

```
-------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.06214846560657e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.58904746840822e-1
n = 20 , left side = 3.27397928461644e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.00830097654147e-2
n = 50 , left side = 1.59921738294495e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.86805268282862e-2
n = 100 , left side = 8.46406889142892e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.13466481639208e-2
n = 200 , left side = 4.34731167188107e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.01590592750934e-2
n = 500 , left side = 1.76635459016661e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.11375456527977e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.27730593967490e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.17956375293982e-2
n = 20 , left side = 5.51875549415474e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.76352476700317e-2
n = 50 , left side = 1.96147392307107e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.50579614270251e-2
n = 100 , left side = 9.37082404104206e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.04398930143077e-2
n = 200 , left side = 4.57407016420697e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.99323007827675e-2
n = 500 , left side = 1.80263907278089e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.11012611701834e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.82403413599863e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.61285890136902e-1
n = 20 , left side = 9.83652130757806e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.12986281304001e-1
n = 50 , left side = 1.58661616720768e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.30860844905281e-2
n = 100 , left side = 3.97114005224797e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94136030501249e-2
n = 200 , left side = 9.93072863738620e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44070636606006e-2
n = 500 , left side = 1.58904558200668e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28880097871443e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.82384972730299e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.61287734223858e-1
n = 20 , left side = 9.83652130103407e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.12986281310545e-1
n = 50 , left side = 1.58661616720779e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.30860844905280e-2
n = 100 , left side = 3.97114005224797e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94136030501249e-2
n = 200 , left side = 9.93072863736399e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44070636606009e-2
n = 500 , left side = 1.58904558195117e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28880097871448e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.13978182742472e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.28128413222641e-1
n = 20 , left side = 4.03151330528322e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.25076695587469e-2
n = 50 , left side = 1.71750977616711e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.74976028960646e-2
n = 100 , left side = 8.75666011423792e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.10540569411118e-2
n = 200 , left side = 4.42003576816363e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.00863351788109e-2
n = 500 , left side = 1.77794791952646e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.11259523234379e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.03887660411088e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.56385710858003e-2
n = 20 , left side = 4.85125066566302e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.43102959549488e-2
n = 50 , left side = 1.84900639739718e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.61826366837640e-2
n = 100 , left side = 9.08552298058340e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.07251940747663e-2
n = 200 , left side = 4.50225906379942e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.00041118831751e-2
n = 500 , left side = 1.79110398947746e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.11127962534869e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 3.18151823405496e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.67711049156338e-1
n = 20 , left side = 1.91703714608062e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.03652431150773e-1
n = 50 , left side = 8.42828905865911e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.62444115990766e-2
n = 100 , left side = 4.33841960820092e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.54722974471488e-2
n = 200 , left side = 2.20002731784108e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.23063436291334e-2
n = 500 , left side = 8.87374774796945e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.20165254681674e-2
```

$\cos(x)$

```
n = 10 , left side = 5.60022821222895e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.43523949374598e-1
n = 20 , left side = 2.52655696431278e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.75572329684513e-2
n = 50 , left side = 9.40570915874672e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.52669914989890e-2
n = 100 , left side = 4.58285294763516e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.52278641077146e-2
n = 200 , left side = 2.26114052848370e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.22452304184908e-2
n = 500 , left side = 8.97153108372684e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.20067471345916e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 3, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.07079403100766e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.88818291186811e-1
n = 20 , left side = 2.69712692001400e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.20125675691565e-1
n = 50 , left side = 4.32446646589146e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.42402540111466e-2
n = 100 , left side = 1.08145141316629e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97025719140331e-2
n = 200 , left side = 2.70379538864773e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44793329930880e-2
n = 500 , left side = 4.32645256465136e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28995737903997e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.07079192966729e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.88818312200215e-1
n = 20 , left side = 2.69711451429500e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.20125688097284e-1
n = 50 , left side = 4.32451705315695e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.42402489524201e-2
n = 100 , left side = 1.08144510928221e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97025725444215e-2
n = 200 , left side = 2.70385644706161e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44793323825039e-2
n = 500 , left side = 4.32596932953278e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28995742736348e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 2.81020112580409e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.20167121046863e-1
n = 20 , left side = 1.13192960828953e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.93897570707951e-1
n = 50 , left side = 1.97199768202380e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.89529517890754e-1
n = 100 , left side = 4.96937065846925e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46219272492489e-1
n = 200 , left side = 1.24482242753232e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02783754909305e-1
n = 500 , left side = 1.99282909238430e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54792615845595e-1
```

$\cos(x)$

```
n = 10 , left side = 3.79132151472260e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 1.22055082155013e-1
n = 20 , left side = 2.73525017015157e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.33565514521747e-1
n = 50 , left side = 1.19231255160033e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.90018239550959e-1
n = 100 , left side = 6.02905495177765e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.90898093633181e-1
n = 200 , left side = 3.02303918697249e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.73798185467112e-1
n = 500 , left side = 1.21017116851970e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.42890187069637e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.32077005703564e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.69110227923708e-1
n = 20 , left side = 8.34251602633361e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.23665371273568e-1
n = 50 , left side = 1.43033452973197e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.94946149413672e-1
n = 100 , left side = 3.60081616191399e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47587826989044e-1
n = 200 , left side = 9.01776666644039e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03126800670193e-1
n = 500 , left side = 1.44354857388840e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54847543897445e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.88403911631343e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.12783321995929e-1
n = 20 , left side = 1.38133766502969e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.68956765033935e-1
n = 50 , left side = 5.97249605600049e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.49524534150987e-1
n = 100 , left side = 3.01590804858815e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.21029562665076e-1
n = 200 , left side = 1.51169260282012e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88911651308636e-1
n = 500 , left side = 6.05096664718727e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48940932107646e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.27034055745695e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.74153177881578e-1
n = 20 , left side = 7.37481055329424e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.33342426003962e-1
n = 50 , left side = 1.24956003605798e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96753894350412e-1
n = 100 , left side = 3.14449207071277e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48044151080245e-1
n = 200 , left side = 7.87419354415397e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03241157982422e-1
n = 500 , left side = 1.26045283250442e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54865853471583e-1
```

$$\cos(x)$$

```
n = 10 , left side = 2.25304894412771e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.78656744185995e-1
n = 20 , left side = 7.79266574942499e-4
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.06311264961962e-1
n = 50 , left side = 1.39266766903497e-8
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249480784315e-1
n = 100 , left side = 2.08492077768963e-16
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 1.21599398134082e-16
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.14539549030677e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.86647684596595e-1
n = 20 , left side = 3.09301562842154e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.76160375252689e-1
n = 50 , left side = 5.01912177534103e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04230372935651e-1
n = 100 , left side = 1.25730684124259e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49931336309715e-1
n = 200 , left side = 3.14484927304015e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03714092409533e-1
n = 500 , left side = 5.03246801341062e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54941574074700e-1
```

$$\cos(x)$$

```
n = 10 , left side = 2.73397048479369e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.27790185147903e-1
n = 20 , left side = 1.47740917958163e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.59349613578742e-1
n = 50 , left side = 6.02875350154217e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.48961959695570e-1
n = 100 , left side = 3.02300139906137e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.20958629160344e-1
n = 200 , left side = 1.51258120872224e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88902765249615e-1
n = 500 , left side = 6.05153570279965e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48940363052034e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 8.46943051161931e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.16492928511079e-1
n = 20 , left side = 2.25372980740796e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.84553233462825e-1
n = 50 , left side = 3.65063570594104e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.05598859005051e-1
n = 100 , left side = 9.14265368418654e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50274377782539e-1
n = 200 , left side = 2.28666936088473e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03799910400748e-1
n = 500 , left side = 3.65912185837924e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54955307536250e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.38088121459155e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.63099112168117e-1
n = 20 , left side = 7.40822296930422e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.33008301843862e-1
n = 50 , left side = 3.01575725444235e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79091922166568e-1
n = 100 , left side = 1.51167370670196e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.36071906083938e-1
n = 200 , left side = 7.56312244168928e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96465454895148e-1
n = 500 , left side = 3.02578170337101e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51966117051463e-1
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.49682575126590e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.26218976114613e-1
n = 20 , left side = 1.97345786880581e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.87355952848846e-1
n = 50 , left side = 3.19433443075401e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06055160280238e-1
n = 100 , left side = 7.99909485652228e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50388733665306e-1
n = 200 , left side = 2.00060393351076e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03828516943486e-1
n = 500 , left side = 3.20133840946424e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54959885370739e-1
```

$$\cos(x)$$

```
n = 10 , left side = 7.04532217172713e-4
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.00482701410100e-1
n = 20 , left side = 6.63818954247507e-7
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07089867717950e-1
n = 50 , left side = 1.57276566338760e-16
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494710992e-1
n = 100 , left side = 5.71882779779079e-17
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 8.45986167021040e-18
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 1.28032927397515e-16
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.21415767138914e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.69045656913381e-1
n = 20 , left side = 8.14060532295169e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.98949926213953e-1
n = 50 , left side = 1.30724356879253e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07942251142199e-1
n = 100 , left side = 3.26980967974455e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50861662182984e-1
n = 200 , left side = 8.17558775584315e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03946821459279e-1
n = 500 , left side = 1.30814170619109e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54978817337772e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.47556606284860e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.53630627342412e-1
n = 20 , left side = 7.51747166046844e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.31915814932220e-1
n = 50 , left side = 3.02285025416903e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79020992169301e-1
n = 100 , left side = 1.51256229817655e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.36063020169193e-1
n = 200 , left side = 7.56423377545473e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96464343561382e-1
n = 500 , left side = 3.02585283509449e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51966045919739e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.37590409984008e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.77428192628872e-1
n = 20 , left side = 6.00731178933889e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01083219747566e-1
n = 50 , left side = 9.64219238242969e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08285275472749e-1
n = 100 , left side = 2.41164052391385e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50947479098567e-1
n = 200 , left side = 6.02978442381108e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03968279492599e-1
n = 500 , left side = 9.64796114033550e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54982250793693e-1
```

$$\cos(x)$$

```
n = 10 , left side = 7.39898230982135e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.27197410529059e-1
n = 20 , left side = 3.76142612925576e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69476270244347e-1
n = 50 , left side = 1.51159813525709e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.94133513358421e-1
n = 100 , left side = 7.56302785100421e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43625615299954e-1
n = 200 , left side = 3.78214393982684e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00246433397010e-1
n = 500 , left side = 1.51292816227427e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53478970592559e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09597400546390e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.80227493572633e-1
n = 20 , left side = 5.29587464117243e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01794656895732e-1
n = 50 , left side = 8.49869065808306e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08399625645183e-1
n = 100 , left side = 2.12557868378482e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50976085282580e-1
n = 200 , left side = 5.31451319673026e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03975432204870e-1
n = 500 , left side = 8.50347482794778e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54983395280006e-1
```

$$\cos(x)$$

```
n = 10 , left side = 5.68168070970416e-7
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.01186665459201e-1
n = 20 , left side = 1.54042889555301e-10
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07090531382862e-1
n = 50 , left side = 2.99987812368840e-11
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494680993e-1
n = 100 , left side = 2.90151236370662e-11
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643121943e-1
n = 200 , left side = 2.54475329697357e-11
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577311389e-1
n = 500 , left side = 7.21850357265907e-12
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898747615e-1
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.81020112580409e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.52076534364290e-2
n = 20 , left side = 1.13192960828953e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.10413836921026e-1
n = 50 , left side = 1.97199768202380e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21701379417072e-1
n = 100 , left side = 4.96937065846925e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.50306293415308e-2
n = 200 , left side = 1.24482242753232e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.94658556911224e-2
n = 500 , left side = 1.99282909238430e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45220766407574e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.79132151472260e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = -6.29043854554216e-2
n = 20 , left side = 2.73525017015157e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -4.99182192651782e-2
n = 50 , left side = 1.19231255160033e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 2.21901010772767e-2
n = 100 , left side = 6.02905495177765e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 3.97094504822235e-2
n = 200 , left side = 3.02303918697249e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.04802862489299e-2
n = 500 , left side = 1.21017116851970e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.26196478647988e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.32077005703564e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 8.41507603132736e-2
n = 20 , left side = 8.34251602633361e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.40181637486643e-1
n = 50 , left side = 1.43033452973197e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27118010939990e-1
n = 100 , left side = 3.60081616191399e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.63991838380860e-2
n = 200 , left side = 9.01776666644039e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.98089014520107e-2
n = 500 , left side = 1.44354857388840e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45770046926070e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.88403911631343e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.27823854385495e-1
n = 20 , left side = 1.38133766502969e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.54730312470098e-2
n = 50 , left side = 5.97249605600049e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.16963956773046e-2
n = 100 , left side = 3.01590804858815e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.98409195141185e-2
n = 200 , left side = 1.51169260282012e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.55937520904536e-2
n = 500 , left side = 6.05096664718727e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.86703929028085e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.27034055745695e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 8.91937102711434e-2
n = 20 , left side = 7.37481055329424e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.49858692217037e-1
n = 50 , left side = 1.24956003605798e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28925755876730e-1
n = 100 , left side = 3.14449207071277e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.68555079292872e-2
n = 200 , left side = 7.87419354415397e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.99232587642394e-2
n = 500 , left side = 1.26045283250442e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45953142667454e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.25304894412771e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.93697276575561e-1
n = 20 , left side = 7.79266574942499e-4
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22827531175036e-1
n = 50 , left side = 1.39266766903497e-8
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421342310633e-1
n = 100 , left side = 2.08492077768963e-16
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999999998e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 1.21599398134082e-16
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.14539549030677e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.01688216986161e-1
n = 20 , left side = 3.09301562842154e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.92676641465764e-1
n = 50 , left side = 5.01912177534103e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36402234461968e-1
n = 100 , left side = 1.25730684124259e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.87426931587574e-2
n = 200 , left side = 3.14484927304015e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03961931913507e-2
n = 500 , left side = 5.03246801341062e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46710348698617e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.73397048479369e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.28307175374686e-2
n = 20 , left side = 1.47740917958163e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 7.58658797918160e-2
n = 50 , left side = 6.02875350154217e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.11338212218878e-2
n = 100 , left side = 3.02300139906137e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.97699860093863e-2
n = 200 , left side = 1.51258120872224e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.55848660314323e-2
n = 500 , left side = 6.05153570279965e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.86698238471961e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 8.46943051161931e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.31533460900645e-1
n = 20 , left side = 2.25372980740796e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.01069499675899e-1
n = 50 , left side = 3.65063570594104e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.37770720531368e-1
n = 100 , left side = 9.14265368418654e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.90857346315814e-2
n = 200 , left side = 2.28666936088473e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04820111825663e-2
n = 500 , left side = 3.65912185837924e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46847683314120e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.38088121459155e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.78139644557683e-1
n = 20 , left side = 7.40822296930422e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.49524568056937e-1
n = 50 , left side = 3.01575725444235e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11263783692886e-1
n = 100 , left side = 1.51167370670196e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.48832629329804e-2
n = 200 , left side = 7.56312244168928e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.31475556769655e-2
n = 500 , left side = 3.02578170337101e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.16955778466248e-2
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.49682575126590e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.41259508504179e-1
n = 20 , left side = 1.97345786880581e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.03872219061921e-1
n = 50 , left side = 3.19433443075401e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38227021806555e-1
n = 100 , left side = 7.99909485652228e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.92000905143478e-2
n = 200 , left side = 2.00060393351076e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05106177253037e-2
n = 500 , left side = 3.20133840946424e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46893461659012e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.04532217172713e-4
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.15523233799665e-1
n = 20 , left side = 6.63818954247507e-7
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23606133931025e-1
n = 50 , left side = 1.57276566338760e-16
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356237309e-1
n = 100 , left side = 5.71882779779079e-17
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 8.45986167021040e-18
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186547e-2
n = 500 , left side = 1.28032927397515e-16
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.21415767138914e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.84086189302947e-1
n = 20 , left side = 8.14060532295169e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.15466192427027e-1
n = 50 , left side = 1.30724356879253e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40114112668517e-1
n = 100 , left side = 3.26980967974455e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96730190320256e-2
n = 200 , left side = 8.17558775584315e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06289222410963e-2
n = 500 , left side = 1.30814170619109e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47082781329339e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.47556606284860e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.68671159731978e-1
n = 20 , left side = 7.51747166046844e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.48432081145295e-1
n = 50 , left side = 3.02285025416903e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11192853695619e-1
n = 100 , left side = 1.51256229817655e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.48743770182346e-2
n = 200 , left side = 7.56423377545473e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.31464443432000e-2
n = 500 , left side = 3.02585283509449e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.16955067149013e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.37590409984008e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.92468725018437e-1
n = 20 , left side = 6.00731178933889e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.17599485960640e-1
n = 50 , left side = 9.64219238242969e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40457136999067e-1
n = 100 , left side = 2.41164052391385e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97588359476086e-2
n = 200 , left side = 6.02978442381108e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06503802744166e-2
n = 500 , left side = 9.64796114033550e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47117115888555e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.39898230982135e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.42237942918624e-1
n = 20 , left side = 3.76142612925576e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.85992536457421e-1
n = 50 , left side = 1.51159813525709e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.26305374884739e-1
n = 100 , left side = 7.56302785100421e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.24369721489958e-2
n = 200 , left side = 3.78214393982684e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.69285341788279e-2
n = 500 , left side = 1.51292816227427e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32084313877215e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09597400546390e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.95268025962199e-1
n = 20 , left side = 5.29587464117243e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.18310923108807e-1
n = 50 , left side = 8.49869065808306e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40571487171501e-1
n = 100 , left side = 2.12557868378482e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97874421316215e-2
n = 200 , left side = 5.31451319673026e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06575329866874e-2
n = 500 , left side = 8.50347482794778e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47128560751678e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.68168070970416e-7
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.16227197848767e-1
n = 20 , left side = 1.54042889555301e-10
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23606797595936e-1
n = 50 , left side = 2.99987812368840e-11
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356207311e-1
n = 100 , left side = 2.90151236370662e-11
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999709849e-2
n = 200 , left side = 2.54475329697357e-11
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106780932072e-2
n = 500 , left side = 7.21850357265907e-12
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595427773e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.81020112580409e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -8.14938810835209e-2
n = 20 , left side = 1.13192960828953e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.62984178262602e-3
n = 50 , left side = 1.97199768202380e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.49527238374978e-2
n = 100 , left side = 4.96937065846925e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.48413463968805e-2
n = 200 , left side = 1.24482242753232e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.32615485194422e-2
n = 500 , left side = 1.99282909238430e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27046173337259e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.79132151472260e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.79605919975372e-1
n = 20 , left side = 2.73525017015157e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.50702214403578e-1
n = 50 , left side = 1.19231255160033e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -5.45585545022971e-2
n = 100 , left side = 6.02905495177765e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.04798324624268e-2
n = 200 , left side = 3.02303918697249e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -5.72402092275037e-3
n = 500 , left side = 1.21017116851970e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.02188557767347e-4
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.32077005703564e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -3.25507742066764e-2
n = 20 , left side = 8.34251602633361e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.93976423482429e-2
n = 50 , left side = 1.43033452973197e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.03693553604161e-2
n = 100 , left side = 3.60081616191399e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.62099008934357e-2
n = 200 , left side = 9.01776666644039e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.36045942803305e-2
n = 500 , left side = 1.44354857388840e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27595453855755e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.88403911631343e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.11223198655450e-2
n = 20 , left side = 1.38133766502969e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.53109638913901e-2
n = 50 , left side = 5.97249605600049e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.94774009773090e-3
n = 100 , left side = 3.01590804858815e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.65163656946820e-3
n = 200 , left side = 1.51169260282012e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 9.38944491877331e-3
n = 500 , left side = 6.05096664718727e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.85293359577705e-3
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.27034055745695e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -2.75078242488066e-2
n = 20 , left side = 7.37481055329424e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.90746970786366e-2
n = 50 , left side = 1.24956003605798e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.21771002971559e-2
n = 100 , left side = 3.14449207071277e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.66662249846370e-2
n = 200 , left side = 7.87419354415397e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.37189515925591e-2
n = 500 , left side = 1.26045283250442e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27778549597139e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.25304894412771e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.76995742055611e-1
n = 20 , left side = 7.79266574942499e-4
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22043536036637e-1
n = 50 , left side = 1.39266766903497e-8
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46726867310591e-2
n = 100 , left side = 2.08492077768963e-16
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553495e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 1.21599398134082e-16
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429642e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.14539549030677e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.49866824662111e-2
n = 20 , left side = 3.09301562842154e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.18926463273637e-2
n = 50 , left side = 5.01912177534103e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.96535788823947e-2
n = 100 , left side = 1.25730684124259e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.85534102141071e-2
n = 200 , left side = 3.14484927304015e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41918860196705e-2
n = 500 , left side = 5.03246801341062e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28535755628302e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.73397048479369e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.38708169824814e-2
n = 20 , left side = 1.47740917958163e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -2.49181153465839e-2
n = 50 , left side = 6.02875350154217e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.38516564231407e-3
n = 100 , left side = 3.02300139906137e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.58070306473599e-3
n = 200 , left side = 1.51258120872224e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 9.38055885975208e-3
n = 500 , left side = 6.05153570279965e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.85236454016468e-3
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 8.46943051161931e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.14831926380695e-1
n = 20 , left side = 2.25372980740796e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.00285504537499e-1
n = 50 , left side = 3.65063570594104e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.10220649517947e-2
n = 100 , left side = 9.14265368418654e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.88964516869311e-2
n = 200 , left side = 2.28666936088473e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42777040108860e-2
n = 500 , left side = 3.65912185837924e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28673090243805e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.38088121459155e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.14381100377330e-2
n = 20 , left side = 7.40822296930422e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.87405729185369e-2
n = 50 , left side = 3.01575725444235e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.45151281133122e-2
n = 100 , left side = 1.51167370670196e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.46939799883302e-2
n = 200 , left side = 7.56312244168928e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.69432485052852e-2
n = 500 , left side = 3.02578170337101e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.87811853959331e-3
```

```
-------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.49682575126590e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.24557973984229e-1
n = 20 , left side = 1.97345786880581e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.03088223923521e-1
n = 50 , left side = 3.19433443075401e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.14783662269817e-2
n = 100 , left side = 7.99909485652228e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.90108075696975e-2
n = 200 , left side = 2.00060393351076e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43063105536234e-2
n = 500 , left side = 3.20133840946424e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28718868588697e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.04532217172713e-4
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.98821699279715e-1
n = 20 , left side = 6.63818954247507e-7
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22822138792625e-1
n = 50 , left side = 1.57276566338760e-16
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006577356e-2
n = 100 , left side = 5.71882779779079e-17
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553497e-2
n = 200 , left side = 8.45986167021040e-18
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 1.28032927397515e-16
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429642e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.21415767138914e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.67384654782997e-1
n = 20 , left side = 8.14060532295169e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.14682197288627e-1
n = 50 , left side = 1.30724356879253e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.33654570889432e-2
n = 100 , left side = 3.26980967974455e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94837360873753e-2
n = 200 , left side = 8.17558775584315e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44246150694161e-2
n = 500 , left side = 1.30814170619109e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28908188259024e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.47556606284860e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.19696252120278e-2
n = 20 , left side = 7.51747166046844e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.76480860068946e-2
n = 50 , left side = 3.02285025416903e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.44441981160455e-2
n = 100 , left side = 1.51256229817655e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.46850940735843e-2
n = 200 , left side = 7.56423377545473e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.69421371715198e-2
n = 500 , left side = 3.02585283509449e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.87804740786983e-3
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.37590409984008e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.75767190498487e-1
n = 20 , left side = 6.00731178933889e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.16815490822240e-1
n = 50 , left side = 9.64219238242969e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.37084814194928e-2
n = 100 , left side = 2.41164052391385e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95695530029583e-2
n = 200 , left side = 6.02978442381108e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44460731027364e-2
n = 500 , left side = 9.64796114033550e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28942522818240e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.39898230982135e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.25536408398674e-1
n = 20 , left side = 3.76142612925576e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.52085413190214e-2
n = 50 , left side = 1.51159813525709e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.95567193051649e-2
n = 100 , left side = 7.56302785100421e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.22476892043455e-2
n = 200 , left side = 3.78214393982684e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.07242270071477e-2
n = 500 , left side = 1.51292816227427e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.13909720806900e-2
```

```
--------------------------------------------------------------------------------
```

```
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09597400546390e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.78566491442249e-1
n = 20 , left side = 5.29587464117243e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17526927970407e-1
n = 50 , left side = 8.49869065808306e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.38228315919274e-2
n = 100 , left side = 2.12557868378482e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95981591869713e-2
n = 200 , left side = 5.31451319673026e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44532258150072e-2
n = 500 , left side = 8.50347482794778e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28953967681364e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.68168070970416e-7
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.99525663328817e-1
n = 20 , left side = 1.54042889555301e-10
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22822802457536e-1
n = 50 , left side = 2.99987812368840e-11
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006277370e-2
n = 100 , left side = 2.90151236370662e-11
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170263346e-2
n = 200 , left side = 2.54475329697357e-11
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709215270e-2
n = 500 , left side = 7.21850357265907e-12
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002357458e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.59670416080878e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.41516817546394e-1
n = 20 , left side = 9.72188312719503e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.09871700264954e-1
n = 50 , left side = 1.65953574461681e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.92654137264824e-1
n = 100 , left side = 4.17666880694478e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47011974344013e-1
n = 200 , left side = 1.04591804479925e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02982659292038e-1
n = 500 , left side = 1.67425459808301e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54824473295025e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.74820144167218e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 1.26367089460054e-1
n = 20 , left side = 2.55195709786687e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.51894821750217e-1
n = 50 , left side = 1.09512408851853e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.99737085859139e-1
n = 100 , left side = 5.52768392704613e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.95911803880497e-1
n = 200 , left side = 2.77039874947656e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.76324589842071e-1
n = 500 , left side = 1.10889527170912e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.43902946037742e-1
```

```
-------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09589580757104e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.91597652870168e-1
n = 20 , left side = 7.13255649254823e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.35764966611422e-1
n = 50 , left side = 1.20373646494268e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.97212130061565e-1
n = 100 , left side = 3.02699828334207e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48161644867616e-1
n = 200 , left side = 7.57860092324258e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03270717244513e-1
n = 500 , left side = 1.21307447418895e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54870591307415e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.87736124441305e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.13451109185968e-1
n = 20 , left side = 1.28731714979751e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.78358816557153e-1
n = 50 , left side = 5.48404970391368e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.54408997671855e-1
n = 100 , left side = 2.76490462085282e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23539596942430e-1
n = 200 , left side = 1.38533249004043e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90175252436433e-1
n = 500 , left side = 5.54456160316980e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49447337151664e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00900395201895e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.00286838425378e-1
n = 20 , left side = 6.28049320488505e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.44285599488054e-1
n = 50 , left side = 1.05164762327522e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.98733018478240e-1
n = 100 , left side = 2.64367655879105e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48544966592167e-1
n = 200 , left side = 6.61834623500224e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03366742713337e-1
n = 500 , left side = 1.05934619056169e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54885964135778e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.66610983054087e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.84526135321864e-1
n = 20 , left side = 4.09990480435273e-4
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.06680541056469e-1
n = 50 , left side = 2.67487884863598e-9
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249492036113e-1
n = 100 , left side = 1.39536476241382e-17
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 2.79162081134697e-17
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 9.62530124777160e-17
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 9.84826134043600e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.02704620222912e-1
n = 20 , left side = 2.61046861206301e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.80985845416274e-1
n = 50 , left side = 4.22645955857981e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.05023035152412e-1
n = 100 , left side = 1.05840494481002e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50130238206148e-1
n = 200 , left side = 2.64713303538500e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03763864033298e-1
n = 500 , left side = 4.23591513525334e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54949539603481e-1
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457693e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.46187995169579e-1
n = 20 , left side = 1.35881405538451e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.71209125998454e-1
n = 50 , left side = 5.52740754515298e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53975419259462e-1
n = 100 , left side = 2.77036411956434e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23485001955315e-1
n = 200 , left side = 1.38601618045098e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90168415532327e-1
n = 500 , left side = 5.54499938996760e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446899364866e-1
```

```
-------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486468e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.28631132978626e-1
n = 20 , left side = 1.90326036120040e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.88057927924900e-1
n = 50 , left side = 3.07684651802265e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06172648192969e-1
n = 100 , left side = 7.70350593050306e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50418292557908e-1
n = 200 , left side = 1.92658947488766e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03835918389348e-1
n = 500 , left side = 3.08286271128999e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54961070127721e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72544743619751e-1
n = 20 , left side = 6.81042176000300e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.38986313936874e-1
n = 50 , left side = 2.76476637677382e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81601830943254e-1
n = 100 , left side = 1.38531517342039e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37335491416754e-1
n = 200 , left side = 6.93024738450044e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97098329952337e-1
n = 500 , left side = 2.77251035146461e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219388403369e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492424e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37175724978030e-1
n = 20 , left side = 1.66715291654220e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90419002371482e-1
n = 50 , left side = 2.69354395939925e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06555950751592e-1
n = 100 , left side = 6.74326324543340e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50514316826415e-1
n = 200 , left side = 1.68640444148105e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03859936892689e-1
n = 500 , left side = 2.69851091845297e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54964913645649e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.68331709595526e-4
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.00818901917677e-1
n = 20 , left side = 1.81936348626292e-7
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07090349600556e-1
n = 50 , left side = 6.07153216591882e-17
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494710992e-1
n = 100 , left side = 3.53477655876253e-17
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 3.56363701568829e-17
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 4.19178074682481e-17
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.73218987411666e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.73865334886106e-1
n = 20 , left side = 6.90589468087843e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.00184636856026e-1
n = 50 , left side = 1.10835163775824e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08141143073233e-1
n = 100 , left side = 2.77209959257063e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50911433191701e-1
n = 200 , left side = 6.93101217302816e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03959267215107e-1
n = 500 , left side = 1.10899618148697e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54980808793019e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.35711685154782e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.65475548472490e-1
n = 20 , left side = 6.89464901817200e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.38144041355184e-1
n = 50 , left side = 2.77022557225579e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81547238988434e-1
n = 100 , left side = 1.38599886244428e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37328654526515e-1
n = 200 , left side = 6.93110233963084e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097474997206e-1
n = 500 , left side = 2.77256501313627e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219333741697e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377556e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.80928628589517e-1
n = 20 , left side = 5.11322907698697e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01977302459917e-1
n = 50 , left side = 8.20311672977692e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08429183038014e-1
n = 100 , left side = 2.05156512413929e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50983486638544e-1
n = 200 , left side = 5.12940438199827e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03977283293017e-1
n = 500 , left side = 8.20726742589706e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54983691487408e-1
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.33168075685853e-1
n = 20 , left side = 3.44939608010512e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72596570735853e-1
n = 50 , left side = 1.38524597520622e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95397034958929e-1
n = 100 , left side = 6.93016042367849e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44258482727280e-1
n = 200 , left side = 3.46557187207853e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00563005464758e-1
n = 500 , left side = 1.38628390798501e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53605614846849e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.83286775969330e-1
n = 20 , left side = 4.51543399532350e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.02575097541581e-1
n = 50 , left side = 7.24292150887429e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08525202560104e-1
n = 100 , left side = 1.81138319373497e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51007504831585e-1
n = 200 , left side = 4.52886594524138e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03983288677385e-1
n = 500 , left side = 7.24636777016396e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54984652387064e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523750139e-7
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.01187075757749e-1
n = 20 , left side = 8.57307780402604e-10
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07090530679597e-1
n = 50 , left side = 1.66778194553296e-10
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494544214e-1
n = 100 , left side = 1.61355867876007e-10
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188642989602e-1
n = 200 , left side = 1.41525666144846e-10
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577195311e-1
n = 500 , left side = 4.01469038666538e-11
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898714687e-1
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.59670416080878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 5.65573499359599e-2
n = 20 , left side = 9.72188312719503e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.26387966478029e-1
n = 50 , left side = 1.65953574461681e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24825998791141e-1
n = 100 , left side = 4.17666880694478e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.58233311930552e-2
n = 200 , left side = 1.04591804479925e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.96647600738555e-2
n = 500 , left side = 1.67425459808301e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45539340901875e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.74820144167218e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = -5.85923781503805e-2
n = 20 , left side = 2.55195709786687e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -3.15889120367084e-2
n = 50 , left side = 1.09512408851853e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 3.19089473854568e-2
n = 100 , left side = 5.52768392704613e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.47231607295387e-2
n = 200 , left side = 2.77039874947656e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.30066906238892e-2
n = 500 , left side = 1.10889527170912e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.36324068329046e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09589580757104e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.06638185259734e-1
n = 20 , left side = 7.13255649254823e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.52281232824497e-1
n = 50 , left side = 1.20373646494268e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.29383991587883e-1
n = 100 , left side = 3.02699828334207e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.69730017166579e-2
n = 200 , left side = 7.57860092324258e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.99528180263305e-2
n = 500 , left side = 1.21307447418895e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46000521025769e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.87736124441305e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.28491641575533e-1
n = 20 , left side = 1.28731714979751e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 9.48750827702277e-2
n = 50 , left side = 5.48404970391368e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.65808591981727e-2
n = 100 , left side = 2.76490462085282e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.23509537914718e-2
n = 200 , left side = 1.38533249004043e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68573532182504e-2
n = 500 , left side = 5.54456160316980e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91767979468260e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00900395201895e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.15327370814943e-1
n = 20 , left side = 6.28049320488505e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.60801865701128e-1
n = 50 , left side = 1.05164762327522e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.30904880004557e-1
n = 100 , left side = 2.64367655879105e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.73563234412090e-2
n = 200 , left side = 6.61834623500224e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.00488434951545e-2
n = 500 , left side = 1.05934619056169e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46154249309396e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.66610983054087e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.99566667711429e-1
n = 20 , left side = 4.09990480435273e-4
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23196807269544e-1
n = 50 , left side = 2.67487884863598e-9
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421353562431e-1
n = 100 , left side = 1.39536476241382e-17
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 2.79162081134697e-17
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186547e-2
n = 500 , left side = 9.62530124777160e-17
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 9.84826134043600e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.17745152612478e-1
n = 20 , left side = 2.61046861206301e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.97502111629349e-1
n = 50 , left side = 4.22645955857981e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.37194896678730e-1
n = 100 , left side = 1.05840494481002e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.89415950551900e-2
n = 200 , left side = 2.64713303538500e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04459648151163e-2
n = 500 , left side = 4.23591513525334e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46790003986433e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457693e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 6.12285275591445e-2
n = 20 , left side = 1.35881405538451e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.77253922115282e-2
n = 50 , left side = 5.52740754515298e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.61472807857797e-2
n = 100 , left side = 2.77036411956434e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.22963588043566e-2
n = 200 , left side = 1.38601618045098e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68505163141450e-2
n = 500 , left side = 5.54499938996760e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91763601600282e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486468e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.43671665368191e-1
n = 20 , left side = 1.90326036120040e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.04574194137975e-1
n = 50 , left side = 3.07684651802265e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38344509719287e-1
n = 100 , left side = 7.70350593050306e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.92296494069497e-2
n = 200 , left side = 1.92658947488766e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05180191711660e-2
n = 500 , left side = 3.08286271128999e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46905309228829e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87585276009317e-1
n = 20 , left side = 6.81042176000300e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.55502580149949e-1
n = 50 , left side = 2.76476637677382e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13773692469571e-1
n = 100 , left side = 1.38531517342039e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61468482657961e-2
n = 200 , left side = 6.93024738450044e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37804307341543e-2
n = 500 , left side = 2.77251035146461e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19488491985312e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492424e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52216257367596e-1
n = 20 , left side = 1.66715291654220e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.06935268584557e-1
n = 50 , left side = 2.69354395939925e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38727812277910e-1
n = 100 , left side = 6.74326324543340e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.93256736754567e-2
n = 200 , left side = 1.68640444148105e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05420376745066e-2
n = 500 , left side = 2.69851091845297e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46943744408113e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.68331709595526e-4
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.15859434307242e-1
n = 20 , left side = 1.81936348626292e-7
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23606615813630e-1
n = 50 , left side = 6.07153216591882e-17
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356237309e-1
n = 100 , left side = 3.53477655876253e-17
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 3.56363701568829e-17
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186547e-2
n = 500 , left side = 4.19178074682481e-17
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.73218987411666e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.88905867275671e-1
n = 20 , left side = 6.90589468087843e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.16700903069101e-1
n = 50 , left side = 1.10835163775824e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40313004599551e-1
n = 100 , left side = 2.77209959257063e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97227900407429e-2
n = 200 , left side = 6.93101217302816e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06413679969245e-2
n = 500 , left side = 1.10899618148697e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47102695881809e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.35711685154782e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.80516080862056e-1
n = 20 , left side = 6.89464901817200e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.54660307568259e-1
n = 50 , left side = 2.77022557225579e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13719100514752e-1
n = 100 , left side = 1.38599886244428e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61400113755572e-2
n = 200 , left side = 6.93110233963084e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37795757790239e-2
n = 500 , left side = 2.77256501313627e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487945368595e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377556e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.95969160979082e-1
n = 20 , left side = 5.11322907698697e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.18493568672992e-1
n = 50 , left side = 8.20311672977692e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40601044564332e-1
n = 100 , left side = 2.05156512413929e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97948434875861e-2
n = 200 , left side = 5.12940438199827e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06593840748348e-2
n = 500 , left side = 8.20726742589706e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47131522825699e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.48208608075418e-1
n = 20 , left side = 3.44939608010512e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.89112836948928e-1
n = 50 , left side = 1.38524597520622e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27568896485247e-1
n = 100 , left side = 6.93016042367849e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30698395763215e-2
n = 200 , left side = 3.46557187207853e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72451062465762e-2
n = 500 , left side = 1.38628390798501e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33350756420108e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.98327308358895e-1
n = 20 , left side = 4.51543399532350e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.19091363754655e-1
n = 50 , left side = 7.24292150887429e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40697064086422e-1
n = 100 , left side = 1.81138319373497e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98188616806265e-2
n = 200 , left side = 4.52886594524138e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06653894592023e-2
n = 500 , left side = 7.24636777016396e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47141131822256e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523750139e-7
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.16227608147314e-1
n = 20 , left side = 8.57307780402604e-10
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23606796892671e-1
n = 50 , left side = 1.66778194553296e-10
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356070531e-1
n = 100 , left side = 1.61355867876007e-10
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999998386441e-2
n = 200 , left side = 1.41525666144846e-10
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106779771291e-2
n = 500 , left side = 4.01469038666538e-11
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595098489e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.59670416080878e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -6.01441845839900e-2
n = 20 , left side = 9.72188312719503e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.56039713396287e-2
n = 50 , left side = 1.65953574461681e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.80773432115676e-2
n = 100 , left side = 4.17666880694478e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.56340482484050e-2
n = 200 , left side = 1.04591804479925e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.34604529021752e-2
n = 500 , left side = 1.67425459808301e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27364747831560e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.74820144167218e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.75293912670330e-1
n = 20 , left side = 2.55195709786687e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.32372907175108e-1
n = 50 , left side = 1.09512408851853e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -4.48397081941170e-2
n = 100 , left side = 5.52768392704613e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -1.54661222151115e-2
n = 200 , left side = 2.77039874947656e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -3.19761654779109e-3
n = 500 , left side = 1.10889527170912e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.81494752587309e-3
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.09589580757104e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.00633492602164e-2
n = 20 , left side = 7.13255649254823e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.14972376860968e-2
n = 50 , left side = 1.20373646494268e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.26353360083089e-2
n = 100 , left side = 3.02699828334207e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.67837187720077e-2
n = 200 , left side = 7.57860092324258e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.37485108546502e-2
n = 500 , left side = 1.21307447418895e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27825927955454e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.87736124441305e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.17901070555832e-2
n = 20 , left side = 1.28731714979751e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.90891236817223e-3
n = 50 , left side = 5.48404970391368e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.83220361859891e-3
n = 100 , left side = 2.76490462085282e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.21616708468215e-2
n = 200 , left side = 1.38533249004043e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06530460465702e-2
n = 500 , left side = 5.54456160316980e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35933863979453e-3
```

```
-------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00900395201895e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.37416370500684e-3
n = 20 , left side = 6.28049320488505e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.00178705627285e-2
n = 50 , left side = 1.05164762327522e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.41562244249836e-2
n = 100 , left side = 2.64367655879105e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.71670404965587e-2
n = 200 , left side = 6.61834623500224e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.38445363234743e-2
n = 500 , left side = 1.05934619056169e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27979656239082e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.66610983054087e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.82865133191479e-1
n = 20 , left side = 4.09990480435273e-4
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22412812131144e-1
n = 50 , left side = 2.67487884863598e-9
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46726979828569e-2
n = 100 , left side = 1.39536476241382e-17
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553497e-2
n = 200 , left side = 2.79162081134697e-17
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 9.62530124777160e-17
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429642e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 9.84826134043600e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.01043618092528e-1
n = 20 , left side = 2.61046861206301e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.67181164909489e-2
n = 50 , left side = 4.22645955857981e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.04462410991559e-2
n = 100 , left side = 1.05840494481002e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.87523121105397e-2
n = 200 , left side = 2.64713303538500e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42416576434360e-2
n = 500 , left side = 4.23591513525334e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28615410916118e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457693e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -5.54730069608054e-2
n = 20 , left side = 1.35881405538451e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.30586029268717e-2
n = 50 , left side = 5.52740754515298e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.39862520620598e-3
n = 100 , left side = 2.77036411956434e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.21070758597063e-2
n = 200 , left side = 1.38601618045098e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06462091424647e-2
n = 500 , left side = 5.54499938996760e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35890085299673e-3
```

```
-------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486468e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.26970130848241e-1
n = 20 , left side = 1.90326036120040e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.03790198999575e-1
n = 50 , left side = 3.07684651802265e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.15958541397131e-2
n = 100 , left side = 7.70350593050306e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.90403664622994e-2
n = 200 , left side = 1.92658947488766e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43137119994857e-2
n = 500 , left side = 3.08286271128999e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28730716158514e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.08837414893666e-2
n = 20 , left side = 6.81042176000300e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.47185850115490e-2
n = 50 , left side = 2.76476637677382e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.70250368899975e-2
n = 100 , left side = 1.38531517342039e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59575653211458e-2
n = 200 , left side = 6.93024738450044e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75761235624741e-2
n = 500 , left side = 2.77251035146461e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313898914997e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492424e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.35514722847646e-1
n = 20 , left side = 1.66715291654220e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.06151273446157e-1
n = 50 , left side = 2.69354395939925e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.19791566983365e-2
n = 100 , left side = 6.74326324543340e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.91363907308064e-2
n = 200 , left side = 1.68640444148105e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43377305028264e-2
n = 500 , left side = 2.69851091845297e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28769151337798e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.68331709595526e-4
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.99157899787292e-1
n = 20 , left side = 1.81936348626292e-7
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22822620675230e-1
n = 50 , left side = 6.07153216591882e-17
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006577357e-2
n = 100 , left side = 3.53477655876253e-17
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553497e-2
n = 200 , left side = 3.56363701568829e-17
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 4.19178074682481e-17
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 2.73218987411666e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.72204332755721e-1
n = 20 , left side = 6.90589468087843e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.15916907930701e-1
n = 50 , left side = 1.10835163775824e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.35643490199775e-2
n = 100 , left side = 2.77209959257063e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95335070960927e-2
n = 200 , left side = 6.93101217302816e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44370608252442e-2
n = 500 , left side = 1.10899618148697e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28928102811495e-2
```

$\cos(x)$

```
n = 10 , left side = 1.35711685154782e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.38145463421061e-2
n = 20 , left side = 6.89464901817200e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.38763124298591e-2
n = 50 , left side = 2.77022557225579e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69704449351779e-2
n = 100 , left side = 1.38599886244428e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59507284309069e-2
n = 200 , left side = 6.93110233963084e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75752686073437e-2
n = 500 , left side = 2.77256501313627e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313352298281e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377556e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79267626459132e-1
n = 20 , left side = 5.11322907698697e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17709573534592e-1
n = 50 , left side = 8.20311672977692e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.38523889847581e-2
n = 100 , left side = 2.05156512413929e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96055605429358e-2
n = 200 , left side = 5.12940438199827e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44550769031545e-2
n = 500 , left side = 8.20726742589706e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28956929755384e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.31507073555468e-1
n = 20 , left side = 3.44939608010512e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.83288418105279e-2
n = 50 , left side = 1.38524597520622e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.08202409056735e-2
n = 100 , left side = 6.93016042367849e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.28805566316712e-2
n = 200 , left side = 3.46557187207853e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10407990748960e-2
n = 500 , left side = 1.38628390798501e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15176163349793e-2
```

```
--------------------------------------------------------------------------------
```

```
A = e, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.81625773838945e-1
n = 20 , left side = 4.51543399532350e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.18307368616256e-1
n = 50 , left side = 7.24292150887429e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.39484085068483e-2
n = 100 , left side = 1.81138319373497e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96295787359762e-2
n = 200 , left side = 4.52886594524138e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44610822875221e-2
n = 500 , left side = 7.24636777016396e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28966538751942e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523750139e-7
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.99526073627364e-1
n = 20 , left side = 8.57307780402604e-10
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22822801754271e-1
n = 50 , left side = 1.66778194553296e-10
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727004909576e-2
n = 100 , left side = 1.61355867876007e-10
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107168939939e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient
As = [2.5, e, 3] #values for A, they all must be > 2

funcs = [x^(1/3),x, x^2, x^3, x^4, x^10]  #choice of functions
```

```
a = -1   #the interval
b = 1    #the interval
x0=1/2


for A in As:
    ##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
               ␣
↪print("-------------------------------------------------------------------------------")
                print("A = "+str(A) + ", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q) )
               ␣
↪print("-------------------------------------------------------------------------------")

                #the activation function
                phi(x) = 1/(1+q*(A^(-lamda*x)))   #formula 16.1

                #q-deformed and λ-parametrized A-generalized logistic function
                G(x) = 1/2*(phi(x+1) - phi(x-1))    #formula 16.5

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [10, 20, 50, 100, 200, 500]:
                        #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                        #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(L(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
```

```
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10 , left side = 8.95805108030448e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.11606722824228e-1
          n = 20 , left side = 4.03416065022316e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.66748925034673e-1
          n = 50 , left side = 5.01957151080105e-2
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.59053779602981e-1
          n = 100 , left side = 2.88993819229902e-2
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 2.22289261227968e-1
          n = 200 , left side = 1.51899154850691e-2
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 1.88838661851768e-1
          n = 500 , left side = 6.26780696961507e-3
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.48724091785219e-1
```

$$x$$

```
          n = 10 , left side = 1.10241164013081e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.90163117225964e-1
          n = 20 , left side = 1.30391177262059e-1
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 2.76699354274845e-1
          n = 50 , left side = 1.15455286395490e-1
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 1.93794208315501e-1
          n = 100 , left side = 6.04990591439341e-2
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 1.90689584007024e-1
          n = 200 , left side = 3.02588316948710e-2
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 1.73769745641966e-1
```

```
n = 500 , left side = 1.21035327578567e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.42888365996977e-1
```

x^2

```
n = 10 , left side = 1.84783029775342e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.16404203851931e-1
n = 20 , left side = 2.28619406510606e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.78471125026299e-1
n = 50 , left side = 1.51508257176054e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.57741237534938e-1
n = 100 , left side = 7.04530962175749e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.80735546933383e-1
n = 200 , left side = 3.27501331409030e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.71278444195934e-1
n = 500 , left side = 1.25021410068799e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.42489757747954e-1
```

x^3

```
n = 10 , left side = 1.90086031052806e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.11101202574466e-1
n = 20 , left side = 2.52641154715191e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.54449376821714e-1
n = 50 , left side = 1.49047071418280e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.60202423292712e-1
n = 100 , left side = 6.16649125139612e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.89523730636997e-1
n = 200 , left side = 2.66018177208146e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.77426759616022e-1
n = 500 , left side = 9.68648941963357e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.45305409335200e-1
```

x^4

```
n = 10 , left side = 2.38473215082664e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.62714018544608e-1
n = 20 , left side = 2.53702419353397e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.53388112183508e-1
n = 50 , left side = 1.31978287178406e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.77271207532586e-1
n = 100 , left side = 4.82143757326847e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.02974267418273e-1
n = 200 , left side = 1.92277425618226e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.84800834775014e-1
n = 500 , left side = 6.67204291786003e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48319855836974e-1
```

$$x^{10}$$

```
n = 10 , left side = 1.83596290517225e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.17590943110047e-1
n = 20 , left side = 1.62012151383724e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.45078380153180e-1
n = 50 , left side = 4.46630993804775e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.64586395330514e-1
n = 100 , left side = 6.08470988102316e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.45103933269935e-1
n = 200 , left side = 1.27521675453629e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02753360582301e-1
n = 500 , left side = 3.18562669012414e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54673336085821e-1
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.44133199567737e-1
```

```
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.57054034059535e-1
n = 20 , left side = 2.86253183204823e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.78465213216422e-1
n = 50 , left side = 2.08726213332692e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.88376873377722e-1
n = 100 , left side = 1.35960908651172e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37592552285841e-1
n = 200 , left side = 7.39213207110045e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96636445265737e-1
n = 500 , left side = 3.10205780052439e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51889840954309e-1
```

x

```
n = 10 , left side = 1.05327041372249e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.95860192255023e-1
n = 20 , left side = 4.13717997457230e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.65718731791181e-1
n = 50 , left side = 5.73750652034514e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.51874429507540e-1
n = 100 , left side = 3.02489531671046e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.20939689983853e-1
n = 200 , left side = 1.51294158443777e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88899161492459e-1
n = 500 , left side = 6.05176637892846e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48940132375905e-1
```

x^2

```
n = 10 , left side = 1.24576123499625e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.76611110127647e-1
n = 20 , left side = 1.38012858230309e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.69077673306596e-1
n = 50 , left side = 8.42822949580354e-2
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.24967199752956e-1
n = 100 , left side = 3.74617317770052e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.13726911373953e-1
n = 200 , left side = 1.69340196647313e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.87094557672106e-1
n = 500 , left side = 6.34050299903632e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48651395755797e-1
```

x^3

```
n = 10 , left side = 1.14879104259545e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.86308129367727e-1
n = 20 , left side = 1.61686835734369e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.45403695802536e-1
n = 50 , left side = 8.68813040237145e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.22368190687277e-1
n = 100 , left side = 3.41025347979198e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.17086108353038e-1
n = 200 , left side = 1.41289491692595e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.89899628167577e-1
n = 500 , left side = 4.97672853578127e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50015170219052e-1
```

x^4

```
n = 10 , left side = 1.82279956813131e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.18907276814141e-1
n = 20 , left side = 1.70069556189843e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.37020975347061e-1
n = 50 , left side = 7.84096564451796e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.30839838265812e-1
n = 100 , left side = 2.73369572435774e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23851685907381e-1
n = 200 , left side = 1.04341896439651e-2
```

```
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.93594387692872e-1
        n = 500 , left side = 3.46890865260507e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.51522990102229e-1
```

$$x^{10}$$

```
        n = 10 , left side = 1.40180143485341e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.61007090141931e-1
        n = 20 , left side = 1.05397442240957e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.01693089295948e-1
        n = 50 , left side = 2.50910783494860e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.84158416361506e-1
        n = 100 , left side = 3.47455758380147e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.47714085567157e-1
        n = 200 , left side = 7.33865491699202e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03294711845138e-1
        n = 500 , left side = 1.74590088758720e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54817308666075e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 2.27494548387138e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 2.73692685240134e-1
        n = 20 , left side = 9.20097302656440e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.15080801271260e-1
        n = 50 , left side = 1.16096864839778e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.97639808227014e-1
        n = 100 , left side = 2.33030293971486e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.48858340211243e-1
        n = 200 , left side = 5.61472316665541e-4
                1/n^(3/10) = 2.04028577336837e-1
```

```
          difference = 2.03467105020171e-1
n = 500 , left side = 8.90740843827344e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54902824670451e-1
```

x

```
n = 10 , left side = 2.34214730902041e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.66972502725231e-1
n = 20 , left side = 6.67035409136132e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.40386990623291e-1
n = 50 , left side = 1.74789407206788e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07501600638924e-1
n = 100 , left side = 5.22756768239763e-6
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51183415583276e-1
n = 200 , left side = 5.30003263499168e-11
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577283837e-1
n = 500 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 6.33725534956142e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37814680131658e-1
n = 20 , left side = 4.60805618878404e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.61009969649064e-1
n = 50 , left side = 2.24698395749350e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.86779655136057e-1
n = 100 , left side = 6.29476386215339e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44893879288805e-1
n = 200 , left side = 1.57570456808348e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02452872768753e-1
n = 500 , left side = 2.52112743802713e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54739786011031e-1
```

x^3

```
n = 10 , left side = 2.67294554234391e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.74457778203833e-1
n = 20 , left side = 7.37573763765126e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.33333155160392e-1
n = 50 , left side = 3.43473625906568e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.74902132120335e-1
n = 100 , left side = 9.44446042227745e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41744182728681e-1
n = 200 , left side = 2.36355687722167e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01665020459615e-1
n = 500 , left side = 3.78169115703986e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54613729639130e-1
```

x^4

```
n = 10 , left side = 1.28630190484472e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72557043142800e-1
n = 20 , left side = 9.56075627237736e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.11482968813131e-1
n = 50 , left side = 3.63531305456022e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.72896364165389e-1
n = 100 , left side = 9.60960509742477e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41579038053533e-1
n = 200 , left side = 2.37395330358707e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01654624033250e-1
n = 500 , left side = 3.78435264452900e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54613463490381e-1
```

x^{10}

```
n = 10 , left side = 1.01874576636765e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.99312656990508e-1
n = 20 , left side = 6.28834473578848e-2
```

```
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.44207084179020e-1
        n = 50 , left side = 1.34122210673726e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.95837273643619e-1
        n = 100 , left side = 1.77904935120004e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.49409593799758e-1
        n = 200 , left side = 3.13170903900047e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03715406432937e-1
        n = 500 , left side = 4.51983446376149e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54946700410196e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 4.16776482440519e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.59509585383220e-1
        n = 20 , left side = 5.57893515050586e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.51301180031846e-1
        n = 50 , left side = 2.88692145173132e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.80380280193678e-1
        n = 100 , left side = 1.51818158365934e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.36006827314365e-1
        n = 200 , left side = 7.79143245653994e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.96237144880297e-1
        n = 500 , left side = 3.16721387702568e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.51824684877808e-1
```

$$x$$

```
        n = 10 , left side = 1.39297852044569e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.61889381582704e-1
        n = 20 , left side = 1.35053836660812e-1
                1/n^(3/10) = 4.07090531536904e-1
```

```
          difference = 2.72036694876092e-1
n = 50 , left side = 6.05005534742686e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.48748941236723e-1
n = 100 , left side = 3.02588317119646e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.20929811438993e-1
n = 200 , left side = 1.51294159473203e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88899161389517e-1
n = 500 , left side = 6.05176637892824e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48940132375905e-1
```

x^2

```
n = 10 , left side = 2.43157400570180e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.58029833057093e-1
n = 20 , left side = 1.86082180257265e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.21008351279639e-1
n = 50 , left side = 7.05553949291386e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.38694099781853e-1
n = 100 , left side = 3.27751331669406e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.18413509984017e-1
n = 200 , left side = 1.57584913364196e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88270086000417e-1
n = 500 , left side = 6.15241844118397e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48839480313650e-1
```

x^3

```
n = 10 , left side = 2.71022498896814e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.30164734730459e-1
n = 20 , left side = 1.90670493456831e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.16420038080073e-1
n = 50 , left side = 6.18357978326679e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.47413696878324e-1
n = 100 , left side = 2.66415871639060e-2
          1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.24547055987052e-1
n = 200 , left side = 1.23123014505827e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.91716275886254e-1
n = 500 , left side = 4.69118696759235e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50300711787241e-1
```

x^4

```
n = 10 , left side = 2.75121623894182e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.26065609733090e-1
n = 20 , left side = 1.76067752001152e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.31022779535752e-1
n = 50 , left side = 4.84096299223661e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.60839864788626e-1
n = 100 , left side = 1.92701557399375e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.31918487411021e-1
n = 200 , left side = 8.55284045364957e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.95475736883187e-1
n = 500 , left side = 3.17966188740908e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51812236867425e-1
```

x^{10}

```
n = 10 , left side = 1.93566710892432e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.07620522734841e-1
n = 20 , left side = 7.87869297942849e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.28303601742620e-1
n = 50 , left side = 6.16174359721245e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03087751113779e-1
n = 100 , left side = 1.28342103628043e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49905222114678e-1
n = 200 , left side = 4.31090521057667e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03597486815779e-1
n = 500 , left side = 1.37300802767496e-4
          1/n^(3/10) = 1.54991898754834e-1
```

```
                    difference = 1.54854597952066e-1


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10 , left side = 2.77826715380931e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.73404562089179e-1
          n = 20 , left side = 2.03819719834504e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.86708559553454e-1
          n = 50 , left side = 1.35623460940661e-2
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.95687148616926e-1
          n = 100 , left side = 7.38362533994837e-3
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 2.43805017811010e-1
          n = 200 , left side = 3.84471652289065e-3
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 2.00183860813946e-1
          n = 500 , left side = 1.57550867898007e-3
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.53416390075854e-1
```

$$x$$

```
          n = 10 , left side = 4.75511067244829e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.53636126902789e-1
          n = 20 , left side = 6.62725962575954e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.40817935279309e-1
          n = 50 , left side = 3.02497526014290e-2
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.78999742109563e-1
          n = 100 , left side = 1.51294158532012e-2
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 2.36059227297757e-1
          n = 200 , left side = 7.56470797366060e-3
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 1.96463869363176e-1
          n = 500 , left side = 3.02588318946406e-3
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.51966015565370e-1
```

x^2

```
n = 10 , left side = 1.48491297601026e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.52695936026246e-1
n = 20 , left side = 1.05801778974193e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.01288752562711e-1
n = 50 , left side = 3.75629381427749e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.71686556568217e-1
n = 100 , left side = 1.69590196780399e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.34229623472918e-1
n = 200 , left side = 8.02210894257893e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96006468394258e-1
n = 500 , left side = 3.09906734449100e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51892831410343e-1
```

x^3

```
n = 10 , left side = 1.74543914391627e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.26643319235646e-1
n = 20 , left side = 1.13936670353400e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.93153861183505e-1
n = 50 , left side = 3.42630249336759e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.74986469777316e-1
n = 100 , left side = 1.41675838910336e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37021059259924e-1
n = 200 , left side = 6.36914696998986e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97659430366847e-1
n = 500 , left side = 2.37979755496609e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52612101199868e-1
```

x^4

```
n = 10 , left side = 1.84936659040297e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.16250574586975e-1
n = 20 , left side = 1.07128649322207e-1
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.99961882214698e-1
n = 50 , left side = 2.75109665690219e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81738528141970e-1
n = 100 , left side = 1.04742303886479e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.40714412762310e-1
n = 200 , left side = 4.48828977615331e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99540287560684e-1
n = 500 , left side = 1.62395630266564e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53367942452168e-1
```

x^{10}

```
n = 10 , left side = 1.25912093995494e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.75275139631779e-1
n = 20 , left side = 4.50714257301664e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62019105806738e-1
n = 50 , left side = 3.52635586284471e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.05723138848147e-1
n = 100 , left side = 7.40432630933086e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50448210520025e-1
n = 200 , left side = 2.39967309324898e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03788610027512e-1
n = 500 , left side = 7.26045349905503e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54919294219843e-1


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$x^{\frac{1}{3}}$

```
n = 10 , left side = 9.41320549975203e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.07055178629752e-1
n = 20 , left side = 2.08852623683860e-2
          1/n^(3/10) = 4.07090531536904e-1
```

```
          difference = 3.86205269168518e-1
n = 50 , left side = 2.36819069948326e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06881304011508e-1
n = 100 , left side = 5.70420133082850e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50618223017875e-1
n = 200 , left side = 1.41514784419743e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03887062552417e-1
n = 500 , left side = 2.25952166746170e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54969303538159e-1
```

x

```
n = 10 , left side = 6.26904457254607e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.38496787901812e-1
n = 20 , left side = 5.31629450327381e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01774237033631e-1
n = 50 , left side = 4.80171447164723e-6
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09244692996520e-1
n = 100 , left side = 4.84497442165832e-11
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643102508e-1
n = 200 , left side = 5.55111512312578e-16
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336836e-1
n = 500 , left side = 5.55111512312578e-16
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754833e-1
```

x^2

```
n = 10 , left side = 5.35412023725638e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.47646031254709e-1
n = 20 , left side = 3.15503410618829e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.75540190475022e-1
n = 50 , left side = 6.39539397083477e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.02854100740157e-1
n = 100 , left side = 1.60070457487843e-3
          1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.49587938576080e-1
n = 200 , left side = 4.00176162192012e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03628401174645e-1
n = 500 , left side = 6.40281859508596e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54927870568883e-1
```

x^3

```
n = 10 , left side = 8.22514361858364e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.18935797441436e-1
n = 20 , left side = 4.89529007212632e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.58137630815641e-1
n = 50 , left side = 9.59518789082178e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99654306820170e-1
n = 100 , left side = 2.40105688511857e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48787586265839e-1
n = 200 , left side = 6.00264243287851e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03428313093549e-1
n = 500 , left side = 9.60422789260673e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54895856475908e-1
```

x^4

```
n = 10 , left side = 1.05428914892154e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.95758318735119e-1
n = 20 , left side = 5.29409198478274e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.54149611689077e-1
n = 50 , left side = 9.76416843272418e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99485326278268e-1
n = 100 , left side = 2.41169029271288e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48776952858245e-1
n = 200 , left side = 6.00928831799782e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03427648505037e-1
n = 500 , left side = 9.60592923919812e-5
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54895839462442e-1
```

$$x^{10}$$

```
        n = 10 , left side = 7.52454953774607e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.25941738249812e-1
        n = 20 , left side = 2.44674263826304e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.82623105154274e-1
        n = 50 , left side = 1.81340375153014e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.07436090959462e-1
        n = 100 , left side = 3.18395629382466e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50870247521576e-1
        n = 200 , left side = 7.25568763740292e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03956020460463e-1
        n = 500 , left side = 1.13109134075101e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54980587841426e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 5.53223643819492e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.45864869245323e-1
        n = 20 , left side = 3.49587204987340e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.72131811038170e-1
        n = 50 , left side = 1.51494072477863e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.94100087463205e-1
        n = 100 , left side = 7.78301233322961e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.43405630817728e-1
        n = 200 , left side = 3.94613184719019e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.00082445489647e-1
        n = 500 , left side = 1.59193781195486e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53399960942879e-1
```

x

```
n = 10 , left side = 1.36547896537167e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.64639337090105e-1
n = 20 , left side = 7.54980279853713e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.31592503551533e-1
n = 50 , left side = 3.02588317262263e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.78990662984765e-1
n = 100 , left side = 1.51294159424112e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.36059227208547e-1
n = 200 , left side = 7.56470797120523e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96463869365632e-1
n = 500 , left side = 3.02588318848207e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51966015566352e-1
```

x^2

```
n = 10 , left side = 1.90758848287156e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.10428385340116e-1
n = 20 , left side = 9.17539941590603e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.15336537377844e-1
n = 50 , left side = 3.28751331765150e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.76374361534477e-1
n = 100 , left side = 1.57834913272298e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.35405151823728e-1
n = 200 , left side = 7.72822681741009e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96300350519427e-1
n = 500 , left side = 3.05204620387500e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51939852550959e-1
```

x^3

```
n = 10 , left side = 1.97902925347756e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.03284308279516e-1
n = 20 , left side = 8.37936441444989e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.23296887392406e-1
n = 50 , left side = 2.68006648218321e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.82448829889160e-1
n = 100 , left side = 1.23509361465025e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38837707004456e-1
n = 200 , left side = 5.92165438676939e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98106922950068e-1
n = 500 , left side = 2.30883900335052e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52683059751483e-1
```

x^4

```
n = 10 , left side = 1.85153292265392e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.16033941361881e-1
n = 20 , left side = 6.85206362278236e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.38569895309081e-1
n = 50 , left side = 1.94398308325003e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.89809663878491e-1
n = 100 , left side = 8.59270484313122e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.42595938307827e-1
n = 200 , left side = 4.03340763113666e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99995169705700e-1
n = 500 , left side = 1.55255247364129e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53439346281192e-1
```

x^{10}

```
n = 10 , left side = 9.18243826815889e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.09362850945683e-1
n = 20 , left side = 1.25940702253738e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.94496461311531e-1
```

```
n = 50 , left side = 1.31635223250979e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07933142478482e-1
n = 100 , left side = 4.36910333828321e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50751732817130e-1
n = 200 , left side = 1.79456804485886e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03849120532351e-1
n = 500 , left side = 6.38762872677155e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54928022467566e-1


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.91510019495543e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.82036231677718e-1
n = 20 , left side = 1.59336570027779e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.91156874534127e-1
n = 50 , left side = 7.34958721372491e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01899907497267e-1
n = 100 , left side = 3.83608528597099e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47352557864987e-1
n = 200 , left side = 1.95929447787643e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02069282858961e-1
n = 500 , left side = 7.93772452471505e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54198126302362e-1
```

$$x$$

```
n = 10 , left side = 6.71853998327485e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.34001833794524e-1
n = 20 , left side = 3.77434599317664e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69347071605138e-1
n = 50 , left side = 1.51294157448426e-2
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.94120078966149e-1
n = 100 , left side = 7.56470791326258e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43623935237695e-1
n = 200 , left side = 3.78235395663140e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00246223380206e-1
n = 500 , left side = 1.51294158265236e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53478957172181e-1
```

x^2

```
n = 10 , left side = 1.09583437523037e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.91603796104236e-1
n = 20 , left side = 4.97548943387787e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.57335637198126e-1
n = 50 , left side = 1.70590195729340e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.92190475138058e-1
n = 100 , left side = 8.04710888143584e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43141534269522e-1
n = 200 , left side = 3.90295419867465e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00125623138162e-1
n = 500 , left side = 1.53223762137955e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53459661133454e-1
```

x^3

```
n = 10 , left side = 1.19603301353538e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.81583932273734e-1
n = 20 , left side = 4.75552674358074e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.59535264101097e-1
n = 50 , left side = 1.43221226440755e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.94927372066916e-1
n = 100 , left side = 6.40721427687202e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44781428874086e-1
n = 200 , left side = 3.01892606674667e-3
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01009651270090e-1
n = 500 , left side = 1.16373090019711e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53828167854637e-1
```

x^4

```
n = 10 , left side = 1.13906821867757e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.87280411759515e-1
n = 20 , left side = 3.98786122663639e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.67211919270541e-1
n = 50 , left side = 1.06344157621009e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.98615078948891e-1
n = 100 , left side = 4.52699368658457e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46661649464373e-1
n = 200 , left side = 2.07465246994464e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01953924866892e-1
n = 500 , left side = 7.85577558848657e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54206321195985e-1
```

x^{10}

```
n = 10 , left side = 5.29211012151615e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.48266132412111e-1
n = 20 , left side = 7.17078983774001e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.99919741699164e-1
n = 50 , left side = 7.66797573539473e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08482697137452e-1
n = 100 , left side = 2.45144088786614e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50943499062171e-1
n = 200 , left side = 9.64420952325753e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03932135241604e-1
n = 500 , left side = 3.30218040759560e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54958876950758e-1
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.31080546426938e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.78079178984579e-1
n = 20 , left side = 4.10160849244644e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.02988923044458e-1
n = 50 , left side = 6.06223868247818e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08643270842744e-1
n = 100 , left side = 1.50365684624608e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51038277466333e-1
n = 200 , left side = 3.75195778786654e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03991057758958e-1
n = 500 , left side = 5.99994079339079e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54985898814040e-1
```

$$x$$

```
n = 10 , left side = 4.77404467351350e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.96413188953759e-1
n = 20 , left side = 4.28164266844111e-5
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07047715110220e-1
n = 50 , left side = 4.20337098461232e-11
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494668958e-1
n = 100 , left side = 2.77555756156289e-16
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 1.11022302462516e-16
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 1.11022302462516e-16
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 3.47804623718355e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.66406771255437e-1
n = 20 , left side = 1.05621876851442e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.96528343851760e-1
n = 50 , left side = 1.70070460099492e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07548790109997e-1
n = 100 , left side = 4.25176166336694e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50763466984621e-1
n = 200 , left side = 1.06294041584243e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03922283295253e-1
n = 500 , left side = 1.70070466533612e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54974891708180e-1
```

x^3

```
n = 10 , left side = 5.34512523933044e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.47735981233968e-1
n = 20 , left side = 1.58604436590267e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.91230087877878e-1
n = 50 , left side = 2.55105692100369e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06698437789988e-1
n = 100 , left side = 6.37764249505235e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50550878901453e-1
n = 200 , left side = 1.59441062376225e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03869136274461e-1
n = 500 , left side = 2.55105699802083e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54966388184854e-1
```

x^4

```
n = 10 , left side = 5.79537249830057e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.43233508644267e-1
n = 20 , left side = 1.63005294377560e-2
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90790002099148e-1
n = 50 , left side = 2.56266075189858e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06686833959093e-1
n = 100 , left side = 6.38489489432709e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50550153661525e-1
n = 200 , left side = 1.59486389871732e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03869090946965e-1
n = 500 , left side = 2.55117303640667e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54966387024470e-1
```

x^{10}

```
n = 10 , left side = 2.89748111254213e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.72212422501851e-1
n = 20 , left side = 3.81120751926907e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03279324017635e-1
n = 50 , left side = 3.39375579818669e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08910119131173e-1
n = 100 , left side = 7.71537611494772e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51111489389809e-1
n = 200 , left side = 1.88337914884282e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04009743545349e-1
n = 500 , left side = 2.99332972483377e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54988905425109e-1
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$x^{\frac{1}{3}}$

```
n = 10 , left side = 8.95805108030448e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.26647255213793e-1
n = 20 , left side = 4.03416065022316e-2
          1/n^(1/2) = 2.23606797749979e-1
```

```
          difference = 1.83265191247747e-1
n = 50 , left side = 5.01957151080105e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.12256411292990e-2
n = 100 , left side = 2.88993819229902e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.11006180770098e-2
n = 200 , left side = 1.51899154850691e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.55207626335856e-2
n = 500 , left side = 6.26780696961507e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.84535525803807e-2
```

x

```
n = 10 , left side = 1.10241164013081e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.05203649615530e-1
n = 20 , left side = 1.30391177262059e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 9.32156204879200e-2
n = 50 , left side = 1.15455286395490e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 2.59660698418192e-2
n = 100 , left side = 6.04990591439341e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 3.95009408560660e-2
n = 200 , left side = 3.02588316948710e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.04518464237838e-2
n = 500 , left side = 1.21035327578567e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.26178267921391e-2
```

x^2

```
n = 10 , left side = 1.84783029775342e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.31444736241496e-1
n = 20 , left side = 2.28619406510606e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -5.01260876062673e-3
n = 50 , left side = 1.51508257176054e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = -1.00869009387445e-2
n = 100 , left side = 7.04530962175749e-2
          1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 2.95469037824251e-2
n = 200 , left side = 3.27501331409030e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 3.79605449777517e-2
n = 500 , left side = 1.25021410068799e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.22192185431159e-2
```

x^3

```
n = 10 , left side = 1.90086031052806e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.26141734964032e-1
n = 20 , left side = 2.52641154715191e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.90343569652118e-2
n = 50 , left side = 1.49047071418280e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = -7.62571518097033e-3
n = 100 , left side = 6.16649125139612e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 3.83350874860388e-2
n = 200 , left side = 2.66018177208146e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.41088603978401e-2
n = 500 , left side = 9.68648941963357e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.50348701303622e-2
```

x^4

```
n = 10 , left side = 2.38473215082664e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.77545509341740e-2
n = 20 , left side = 2.53702419353397e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -3.00956216034180e-2
n = 50 , left side = 1.31978287178406e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.44306905890360e-3
n = 100 , left side = 4.82143757326847e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 5.17856242673153e-2
n = 200 , left side = 1.92277425618226e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.14829355568322e-2
n = 500 , left side = 6.67204291786003e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.80493166321358e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.83596290517225e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.32631475499613e-1
n = 20 , left side = 1.62012151383724e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.15946463662547e-2
n = 50 , left side = 4.46630993804775e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.67582568568320e-2
n = 100 , left side = 6.08470988102316e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.39152901189768e-2
n = 200 , left side = 1.27521675453629e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.94354613641185e-2
n = 500 , left side = 3.18562669012414e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44027968809834e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.44133199567737e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.72094566449101e-1
n = 20 , left side = 2.86253183204823e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.94981479429497e-1
n = 50 , left side = 2.08726213332692e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.20548734904040e-1
n = 100 , left side = 1.35960908651172e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.64039091348828e-2
n = 200 , left side = 7.39213207110045e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.33185460475543e-2
n = 500 , left side = 3.10205780052439e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.16193017494714e-2
```

x

```
n = 10 , left side = 1.05327041372249e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.10900724644588e-1
n = 20 , left side = 4.13717997457230e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.82234998004256e-1
n = 50 , left side = 5.73750652034514e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.40462910338581e-2
n = 100 , left side = 3.02489531671046e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.97510468328954e-2
n = 200 , left side = 1.51294158443777e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.55812622742771e-2
n = 500 , left side = 6.05176637892846e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.86695931710673e-2
```

x^2

```
n = 10 , left side = 1.24576123499625e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.91651642517213e-1
n = 20 , left side = 1.38012858230309e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.55939395196703e-2
n = 50 , left side = 8.42822949580354e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 5.71390612792741e-2
n = 100 , left side = 3.74617317770052e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.25382682229948e-2
n = 200 , left side = 1.69340196647313e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.37766584539235e-2
n = 500 , left side = 6.34050299903632e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.83808565509595e-2
```

x^3

```
n = 10 , left side = 1.14879104259545e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.01348661757293e-1
n = 20 , left side = 1.61686835734369e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.19199620156100e-2
n = 50 , left side = 8.68813040237145e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 5.45400522135950e-2
n = 100 , left side = 3.41025347979198e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.58974652020802e-2
n = 200 , left side = 1.41289491692595e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.65817289493952e-2
n = 500 , left side = 4.97672853578127e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.97446310142145e-2
```

x^4

```
n = 10 , left side = 1.82279956813131e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.33947809203707e-1
n = 20 , left side = 1.70069556189843e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 5.35372415601357e-2
n = 50 , left side = 7.84096564451796e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.30116997921299e-2
n = 100 , left side = 2.73369572435774e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.26630427564226e-2
n = 200 , left side = 1.04341896439651e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.02764884746897e-2
n = 500 , left side = 3.46890865260507e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.12524508973907e-2
```

x^{10}

```
n = 10 , left side = 1.40180143485341e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.76047622531497e-1
n = 20 , left side = 1.05397442240957e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.18209355509022e-1
```

```
n = 50 , left side = 2.50910783494860e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.16330277887823e-1
n = 100 , left side = 3.47455758380147e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.65254424161985e-2
n = 200 , left side = 7.33865491699202e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.99768126269555e-2
n = 500 , left side = 1.74590088758720e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45467694612371e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.27494548387138e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 8.87332176296998e-2
n = 20 , left side = 9.20097302656440e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.31597067484335e-1
n = 50 , left side = 1.16096864839778e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.29811669753332e-1
n = 100 , left side = 2.33030293971486e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.76696970602852e-2
n = 200 , left side = 5.61472316665541e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.01492058019892e-2
n = 500 , left side = 8.90740843827344e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46322854656131e-2
```

$$x$$

```
n = 10 , left side = 2.34214730902041e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 8.20130351147968e-2
n = 20 , left side = 6.67035409136132e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.56903256836366e-1
n = 50 , left side = 1.74789407206788e-3
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39673462165242e-1
n = 100 , left side = 5.22756768239763e-6
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99947724323176e-2
n = 200 , left side = 5.30003263499168e-11
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106780656544e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

x^2

```
n = 10 , left side = 6.33725534956142e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52855212521224e-1
n = 20 , left side = 4.60805618878404e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.77526235862139e-1
n = 50 , left side = 2.24698395749350e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.18951516662374e-1
n = 100 , left side = 6.29476386215339e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.37052361378466e-2
n = 200 , left side = 1.57570456808348e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.91349735505713e-2
n = 500 , left side = 2.52112743802713e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44692468061931e-2
```

x^3

```
n = 10 , left side = 2.67294554234391e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.89498310593399e-1
n = 20 , left side = 7.37573763765126e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.49849421373466e-1
n = 50 , left side = 3.43473625906568e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.07073993646653e-1
n = 100 , left side = 9.44446042227745e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.05555395777226e-2
n = 200 , left side = 2.36355687722167e-3
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.83471212414331e-2
n = 500 , left side = 3.78169115703986e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.43431904342918e-2
```

x^4

```
n = 10 , left side = 1.28630190484472e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87597575532366e-1
n = 20 , left side = 9.56075627237736e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.27999235026205e-1
n = 50 , left side = 3.63531305456022e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.05068225691707e-1
n = 100 , left side = 9.60960509742477e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.03903949025752e-2
n = 200 , left side = 2.37395330358707e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.83367248150677e-2
n = 500 , left side = 3.78435264452900e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.43429242855429e-2
```

x^{10}

```
n = 10 , left side = 1.01874576636765e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.14353189380073e-1
n = 20 , left side = 6.28834473578848e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.60723350392094e-1
n = 50 , left side = 1.34122210673726e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28009135169937e-1
n = 100 , left side = 1.77904935120004e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.82209506488000e-2
n = 200 , left side = 3.13170903900047e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03975072147547e-2
n = 500 , left side = 4.51983446376149e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46761612053582e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.16776482440519e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.74550117772786e-1
n = 20 , left side = 5.57893515050586e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.67817446244920e-1
n = 50 , left side = 2.88692145173132e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.12552141719996e-1
n = 100 , left side = 1.51818158365934e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.48181841634066e-2
n = 200 , left side = 7.79143245653994e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.29192456621148e-2
n = 500 , left side = 3.16721387702568e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.15541456729701e-2
```

$$x$$

```
n = 10 , left side = 1.39297852044569e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.76929913972269e-1
n = 20 , left side = 1.35053836660812e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.85529610891669e-2
n = 50 , left side = 6.05005534742686e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.09208027630409e-2
n = 100 , left side = 3.02588317119646e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.97411682880354e-2
n = 200 , left side = 1.51294159473203e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.55812621713344e-2
n = 500 , left side = 6.05176637892824e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.86695931710676e-2
```

x^2

```
n = 10 , left side = 2.43157400570180e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.30703654466582e-2
n = 20 , left side = 1.86082180257265e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 3.75246174927137e-2
n = 50 , left side = 7.05553949291386e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.08659613081709e-2
n = 100 , left side = 3.27751331669406e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.72248668330594e-2
n = 200 , left side = 1.57584913364196e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.49521867822352e-2
n = 500 , left side = 6.15241844118397e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.85689411088118e-2
```

x^3

```
n = 10 , left side = 2.71022498896814e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.52052671200243e-2
n = 20 , left side = 1.90670493456831e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 3.29363042931479e-2
n = 50 , left side = 6.18357978326679e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.95855584046416e-2
n = 100 , left side = 2.66415871639060e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.33584128360940e-2
n = 200 , left side = 1.23123014505827e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.83983766680721e-2
n = 500 , left side = 4.69118696759235e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.00301725824034e-2
```

x^4

```
n = 10 , left side = 2.75121623894182e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.11061421226559e-2
n = 20 , left side = 1.76067752001152e-1
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 4.75390457488266e-2
n = 50 , left side = 4.84096299223661e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.30117263149434e-2
n = 100 , left side = 1.92701557399375e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.07298442600625e-2
n = 200 , left side = 8.55284045364957e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.21578376650052e-2
n = 500 , left side = 3.17966188740908e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.15416976625867e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.93566710892432e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.22661055124406e-1
n = 20 , left side = 7.87869297942849e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.44819867955694e-1
n = 50 , left side = 6.16174359721245e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.35259612640097e-1
n = 100 , left side = 1.28342103628043e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.87165789637196e-2
n = 200 , left side = 4.31090521057667e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02795875975971e-2
n = 500 , left side = 1.37300802767496e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45840587472283e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.77826715380931e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.88445094478745e-1
n = 20 , left side = 2.03819719834504e-2
          1/n^(1/2) = 2.23606797749979e-1
```

```
          difference = 2.03224825766529e-1
n = 50 , left side = 1.35623460940661e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27859010143243e-1
n = 100 , left side = 7.38362533994837e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.26163746600516e-2
n = 200 , left side = 3.84471652289065e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.68659615957641e-2
n = 500 , left side = 1.57550867898007e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.31458508710157e-2
```

x

```
n = 10 , left side = 4.75511067244829e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.68676659292355e-1
n = 20 , left side = 6.62725962575954e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.57334201492384e-1
n = 50 , left side = 3.02497526014290e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11171603635880e-1
n = 100 , left side = 1.51294158532012e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.48705841467988e-2
n = 200 , left side = 7.56470797366060e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.31459701449942e-2
n = 500 , left side = 3.02588318946406e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.16954763605317e-2
```

x^2

```
n = 10 , left side = 1.48491297601026e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.67736468415812e-1
n = 20 , left side = 1.05801778974193e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.17805018775786e-1
n = 50 , left side = 3.75629381427749e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.03858418094535e-1
n = 100 , left side = 1.69590196780399e-2
          1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 8.30409803219601e-2
n = 200 , left side = 8.02210894257893e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.26885691760758e-2
n = 500 , left side = 3.09906734449100e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.16222922055048e-2
```

x^3

```
n = 10 , left side = 1.74543914391627e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.41683851625211e-1
n = 20 , left side = 1.13936670353400e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.09670127396579e-1
n = 50 , left side = 3.42630249336759e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.07158331303634e-1
n = 100 , left side = 1.41675838910336e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.58324161089664e-2
n = 200 , left side = 6.36914696998986e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.43415311486649e-2
n = 500 , left side = 2.37979755496609e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.23415619950297e-2
```

x^4

```
n = 10 , left side = 1.84936659040297e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.31291106976541e-1
n = 20 , left side = 1.07128649322207e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.16478148427772e-1
n = 50 , left side = 2.75109665690219e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13910389668288e-1
n = 100 , left side = 1.04742303886479e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.95257696113521e-2
n = 200 , left side = 4.48828977615331e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.62223883425014e-2
n = 500 , left side = 1.62395630266564e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.30974032473302e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.25912093995494e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.90315672021344e-1
n = 20 , left side = 4.50714257301664e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78535372019813e-1
n = 50 , left side = 3.52635586284471e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.37895000374465e-1
n = 100 , left side = 7.40432630933086e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.92595673690669e-2
n = 200 , left side = 2.39967309324898e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04707108093299e-2
n = 500 , left side = 7.26045349905503e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46487550150052e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 9.41320549975203e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.22095711019318e-1
n = 20 , left side = 2.08852623683860e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.02721535381593e-1
n = 50 , left side = 2.36819069948326e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39053165537826e-1
n = 100 , left side = 5.70420133082850e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94295798669172e-2
n = 200 , left side = 1.41514784419743e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05691633342350e-2
n = 500 , left side = 2.25952166746170e-5
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46987643333212e-2
```

x

```
n = 10 , left side = 6.26904457254607e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.53537320291377e-1
n = 20 , left side = 5.31629450327381e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.18290503246705e-1
n = 50 , left side = 4.80171447164723e-6
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41416554522838e-1
n = 100 , left side = 4.84497442165832e-11
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999515503e-2
n = 200 , left side = 5.55111512312578e-16
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186542e-2
n = 500 , left side = 5.55111512312578e-16
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499952e-2
```

x^2

```
n = 10 , left side = 5.35412023725638e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.62686563644274e-1
n = 20 , left side = 3.15503410618829e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.92056456688096e-1
n = 50 , left side = 6.39539397083477e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.35025962266475e-1
n = 100 , left side = 1.60070457487843e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.83992954251216e-2
n = 200 , left side = 4.00176162192012e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03105019564627e-2
n = 500 , left side = 6.40281859508596e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46573313640449e-2
```

x^3

```
n = 10 , left side = 8.22514361858364e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.33976329831002e-1
n = 20 , left side = 4.89529007212632e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.74653897028716e-1
n = 50 , left side = 9.59518789082178e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31826168346488e-1
n = 100 , left side = 2.40105688511857e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.75989431148814e-2
n = 200 , left side = 6.00264243287851e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.01104138753669e-2
n = 500 , left side = 9.60422789260673e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46253172710697e-2
```

x^4

```
n = 10 , left side = 1.05428914892154e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.10798851124684e-1
n = 20 , left side = 5.29409198478274e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.70665877902152e-1
n = 50 , left side = 9.76416843272418e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31657187804585e-1
n = 100 , left side = 2.41169029271288e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.75883097072871e-2
n = 200 , left side = 6.00928831799782e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.01097492868550e-2
n = 500 , left side = 9.60592923919812e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46253002576038e-2
```

x^{10}

```
n = 10 , left side = 7.52454953774607e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.40982270639377e-1
n = 20 , left side = 2.44674263826304e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.99139371367349e-1
```

```
n = 50 , left side = 1.81340375153014e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39607952485779e-1
n = 100 , left side = 3.18395629382466e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96816043706175e-2
n = 200 , left side = 7.25568763740292e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06381212422807e-2
n = 500 , left side = 1.13109134075101e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47100486365883e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.53223643819492e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.60905401634889e-1
n = 20 , left side = 3.49587204987340e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88648077251245e-1
n = 50 , left side = 1.51494072477863e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.26271948989523e-1
n = 100 , left side = 7.78301233322961e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.22169876667704e-2
n = 200 , left side = 3.94613184719019e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.67645462714646e-2
n = 500 , left side = 1.59193781195486e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.31294217380409e-2
```

$$x$$

```
n = 10 , left side = 1.36547896537167e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.79679869479670e-1
n = 20 , left side = 7.54980279853713e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.48108769764608e-1
n = 50 , left side = 3.02588317262263e-2
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11162524511083e-1
n = 100 , left side = 1.51294159424112e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.48705840575888e-2
n = 200 , left side = 7.56470797120523e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.31459701474495e-2
n = 500 , left side = 3.02588318848207e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.16954763615137e-2
```

x^2

```
n = 10 , left side = 1.90758848287156e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.25468917729682e-1
n = 20 , left side = 9.17539941590603e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.31852803590919e-1
n = 50 , left side = 3.28751331765150e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.08546223060794e-1
n = 100 , left side = 1.57834913272298e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.42165086727702e-2
n = 200 , left side = 7.72822681741009e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.29824513012447e-2
n = 500 , left side = 3.05204620387500e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.16693133461208e-2
```

x^3

```
n = 10 , left side = 1.97902925347756e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.18324840669082e-1
n = 20 , left side = 8.37936441444989e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.39813153605480e-1
n = 50 , left side = 2.68006648218321e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.14620691415477e-1
n = 100 , left side = 1.23509361465025e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.76490638534975e-2
n = 200 , left side = 5.92165438676939e-3
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.47890237318854e-2
n = 500 , left side = 2.30883900335052e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.24125205466453e-2
```

x^4

```
n = 10 , left side = 1.85153292265392e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.31074473751446e-1
n = 20 , left side = 6.85206362278236e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.55086161522155e-1
n = 50 , left side = 1.94398308325003e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21981525404809e-1
n = 100 , left side = 8.59270484313122e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.14072951568688e-2
n = 200 , left side = 4.03340763113666e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.66772704875181e-2
n = 500 , left side = 1.55255247364129e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.31688070763545e-2
```

x^{10}

```
n = 10 , left side = 9.18243826815889e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.24403383335249e-1
n = 20 , left side = 1.25940702253738e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.11012727524605e-1
n = 50 , left side = 1.31635223250979e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40105004004800e-1
n = 100 , left side = 4.36910333828321e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95630896661717e-2
n = 200 , left side = 1.79456804485886e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05312213141689e-2
n = 500 , left side = 6.38762872677155e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46574832627281e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.91510019495543e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.97076764067284e-1
n = 20 , left side = 1.59336570027779e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.07673140747201e-1
n = 50 , left side = 7.34958721372491e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34071769023585e-1
n = 100 , left side = 3.83608528597099e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.61639147140290e-2
n = 200 , left side = 1.95929447787643e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.87513836407783e-2
n = 500 , left side = 7.93772452471505e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.39275870975243e-2
```

$$x$$

```
n = 10 , left side = 6.71853998327485e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.49042366184089e-1
n = 20 , left side = 3.77434599317664e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.85863337818213e-1
n = 50 , left side = 1.51294157448426e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.26291940492467e-1
n = 100 , left side = 7.56470791326258e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.24352920867374e-2
n = 200 , left side = 3.78235395663140e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.69283241620234e-2
n = 500 , left side = 1.51294158265236e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32084179673434e-2
```

x^2

```
n = 10 , left side = 1.09583437523037e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.06644328493801e-1
n = 20 , left side = 4.97548943387787e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.73851903411200e-1
n = 50 , left side = 1.70590195729340e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24362336664376e-1
n = 100 , left side = 8.04710888143584e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.19528911185642e-2
n = 200 , left side = 3.90295419867465e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.68077239199801e-2
n = 500 , left side = 1.53223762137955e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.31891219286162e-2
```

x^3

```
n = 10 , left side = 1.19603301353538e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.96624464663300e-1
n = 20 , left side = 4.75552674358074e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.76051530314172e-1
n = 50 , left side = 1.43221226440755e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27099233593234e-1
n = 100 , left side = 6.40721427687202e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.35927857231280e-2
n = 200 , left side = 3.01892606674667e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.76917520519081e-2
n = 500 , left side = 1.16373090019711e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.35576286497987e-2
```

x^4

```
n = 10 , left side = 1.13906821867757e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.02320944149081e-1
n = 20 , left side = 3.98786122663639e-2
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.83728185483615e-1
n = 50 , left side = 1.06344157621009e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.30786940475209e-1
n = 100 , left side = 4.52699368658457e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.54730063134154e-2
n = 200 , left side = 2.07465246994464e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.86360256487101e-2
n = 500 , left side = 7.85577558848657e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.39357819911471e-2
```

$$x^{10}$$

```
n = 10 , left side = 5.29211012151615e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.63306664801676e-1
n = 20 , left side = 7.17078983774001e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.16436007912239e-1
n = 50 , left side = 7.66797573539473e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40654558663770e-1
n = 100 , left side = 2.45144088786614e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97548559112134e-2
n = 200 , left side = 9.64420952325753e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06142360234222e-2
n = 500 , left side = 3.30218040759560e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46883377459198e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.31080546426938e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.93119711374144e-1
n = 20 , left side = 4.10160849244644e-3
          1/n^(1/2) = 2.23606797749979e-1
```

```
          difference = 2.19505189257533e-1
n = 50 , left side = 6.06223868247818e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40815132369062e-1
n = 100 , left side = 1.50365684624608e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98496343153754e-2
n = 200 , left side = 3.75195778786654e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06731585407761e-2
n = 500 , left side = 5.99994079339079e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47153596092024e-2
```

x

```
n = 10 , left side = 4.77404467351350e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.11453721343324e-1
n = 20 , left side = 4.28164266844111e-5
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23563981323295e-1
n = 50 , left side = 4.20337098461232e-11
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356195276e-1
n = 100 , left side = 2.77555756156289e-16
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999999997e-2
n = 200 , left side = 1.11022302462516e-16
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186546e-2
n = 500 , left side = 1.11022302462516e-16
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

x^2

```
n = 10 , left side = 3.47804623718355e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.81447303645002e-1
n = 20 , left side = 1.05621876851442e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.13044610064835e-1
n = 50 , left side = 1.70070460099492e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39720651636315e-1
n = 100 , left side = 4.25176166336694e-4
          1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 9.95748238336633e-2
n = 200 , left side = 1.06294041584243e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06043840770705e-2
n = 500 , left side = 1.70070466533612e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47043525033424e-2
```

x^3

```
n = 10 , left side = 5.34512523933044e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.62776513623533e-1
n = 20 , left side = 1.58604436590267e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.07746354090952e-1
n = 50 , left side = 2.55105692100369e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38870299316306e-1
n = 100 , left side = 6.37764249505235e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.93622357504948e-2
n = 200 , left side = 1.59441062376225e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05512370562785e-2
n = 500 , left side = 2.55105699802083e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46958489800156e-2
```

x^4

```
n = 10 , left side = 5.79537249830057e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.58274041033832e-1
n = 20 , left side = 1.63005294377560e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.07306268312223e-1
n = 50 , left side = 2.56266075189858e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38858695485411e-1
n = 100 , left side = 6.38489489432709e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.93615105105673e-2
n = 200 , left side = 1.59486389871732e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05511917287830e-2
n = 500 , left side = 2.55117303640667e-5
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46958478196317e-2
```

$$x^{10}$$

```
n = 10 , left side = 2.89748111254213e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.87252954891417e-1
n = 20 , left side = 3.81120751926907e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.19795590230710e-1
n = 50 , left side = 3.39375579818669e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41081980657491e-1
n = 100 , left side = 7.71537611494772e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99228462388505e-2
n = 200 , left side = 1.88337914884282e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06918443271663e-2
n = 500 , left side = 2.99332972483377e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47183662202710e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 8.95805108030448e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.09945720693843e-1
n = 20 , left side = 4.03416065022316e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.24811961093474e-2
n = 50 , left side = 5.01957151080105e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.44769855497253e-2
n = 100 , left side = 2.88993819229902e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.09113351323595e-2
n = 200 , left side = 1.51899154850691e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 9.31645546190535e-3
n = 500 , left side = 6.26780696961507e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.63609327334925e-3
```

x

```
n = 10 , left side = 1.10241164013081e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.88502115095580e-1
n = 20 , left side = 1.30391177262059e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -7.56837465047991e-3
n = 50 , left side = 1.15455286395490e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -5.07825857377545e-2
n = 100 , left side = 6.04990591439341e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.06883420885843e-2
n = 200 , left side = 3.02588316948710e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -5.75246074789648e-3
n = 500 , left side = 1.21035327578567e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.00367485107629e-4
```

x^2

```
n = 10 , left side = 1.84783029775342e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.47432017215462e-2
n = 20 , left side = 2.28619406510606e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.05796603899027e-1
n = 50 , left side = 1.51508257176054e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -8.68355565183182e-2
n = 100 , left side = 7.04530962175749e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -3.06423791622252e-2
n = 200 , left side = 3.27501331409030e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -8.24376219392852e-3
n = 500 , left side = 1.25021410068799e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 4.01759236084471e-4
```

x^3

```
n = 10 , left side = 1.90086031052806e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.44020044408181e-3
n = 20 , left side = 2.52641154715191e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.29818352103612e-1
n = 50 , left side = 1.49047071418280e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -8.43743707605441e-2
n = 100 , left side = 6.16649125139612e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.18541954586115e-2
n = 200 , left side = 2.66018177208146e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -2.09544677384013e-3
n = 500 , left side = 9.68648941963357e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 3.21741082333075e-3
```

x^4

```
n = 10 , left side = 2.38473215082664e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -3.89469835857759e-2
n = 20 , left side = 2.53702419353397e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.30879616741818e-1
n = 50 , left side = 1.31978287178406e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -6.73055865206701e-2
n = 100 , left side = 4.82143757326847e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -8.40365867733500e-3
n = 200 , left side = 1.92277425618226e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 5.27862838515195e-3
n = 500 , left side = 6.67204291786003e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.23185732510430e-3
```

x^{10}

```
n = 10 , left side = 1.83596290517225e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.59299409796630e-2
n = 20 , left side = 1.62012151383724e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.91893487721452e-2
```

```
n = 50 , left side = 4.46630993804775e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.00096012772582e-2
n = 100 , left side = 6.08470988102316e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.37260071743266e-2
n = 200 , left side = 1.27521675453629e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.32311541924382e-2
n = 500 , left side = 3.18562669012414e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25853375739519e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.44133199567737e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.53930319291508e-2
n = 20 , left side = 2.86253183204823e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.41974842910968e-2
n = 50 , left side = 2.08726213332692e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.38000793244665e-2
n = 100 , left side = 1.35960908651172e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.62146261902326e-2
n = 200 , left side = 7.39213207110045e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.71142388758741e-2
n = 500 , left side = 3.10205780052439e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.80184244243994e-3
```

$$x$$

```
n = 10 , left side = 1.05327041372249e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.41991901246385e-2
n = 20 , left side = 4.13717997457230e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.14510028658560e-2
n = 50 , left side = 5.73750652034514e-2
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 7.29763545428438e-3
n = 100 , left side = 3.02489531671046e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.56176388824510e-3
n = 200 , left side = 1.51294158443777e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 9.37695510259684e-3
n = 500 , left side = 6.05176637892846e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.85213386403587e-3
```

x^2

```
n = 10 , left side = 1.24576123499625e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.49501079972631e-2
n = 20 , left side = 1.38012858230309e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.51900556187296e-2
n = 50 , left side = 8.42822949580354e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.96095943002997e-2
n = 100 , left side = 3.74617317770052e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.34898527834450e-3
n = 200 , left side = 1.69340196647313e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 7.57235128224321e-3
n = 500 , left side = 6.34050299903632e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.56339724392800e-3
```

x^3

```
n = 10 , left side = 1.14879104259545e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.46471272373426e-2
n = 20 , left side = 1.61686835734369e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.88640331227899e-2
n = 50 , left side = 8.68813040237145e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -2.22086033659787e-2
n = 100 , left side = 3.41025347979198e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 5.70818225742996e-3
n = 200 , left side = 1.41289491692595e-2
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.03774217777150e-2
n = 500 , left side = 4.97672853578127e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.92717170718306e-3
```

x^4

```
n = 10 , left side = 1.82279956813131e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.72462746837566e-2
n = 20 , left side = 1.70069556189843e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -4.72467535782642e-2
n = 50 , left side = 7.84096564451796e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.37369557874439e-2
n = 100 , left side = 2.73369572435774e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.24737598117723e-2
n = 200 , left side = 1.04341896439651e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.40721813030094e-2
n = 500 , left side = 3.46890865260507e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.43499159035925e-3
```

x^{10}

```
n = 10 , left side = 1.40180143485341e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.93460880115468e-2
n = 20 , left side = 1.05397442240957e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.74253603706223e-2
n = 50 , left side = 2.50910783494860e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.95816223082497e-2
n = 100 , left side = 3.47455758380147e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.63361594715483e-2
n = 200 , left side = 7.33865491699202e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.37725054552753e-2
n = 500 , left side = 1.74590088758720e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27293101542056e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.27494548387138e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -2.79683168902502e-2
n = 20 , left side = 9.20097302656440e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.08130723459350e-2
n = 50 , left side = 1.16096864839778e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.30630141737580e-2
n = 100 , left side = 2.33030293971486e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.74804141156349e-2
n = 200 , left side = 5.61472316665541e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39448986303090e-2
n = 500 , left side = 8.90740843827344e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28148261585816e-2
```

$$x$$

```
n = 10 , left side = 2.34214730902041e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -3.46884994051531e-2
n = 20 , left side = 6.67035409136132e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.61192616979659e-2
n = 50 , left side = 1.74789407206788e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.29248065856679e-2
n = 100 , left side = 5.22756768239763e-6
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98054894876673e-2
n = 200 , left side = 5.30003263499168e-11
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063708939742e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 6.33725534956142e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.36153678001274e-1
n = 20 , left side = 4.60805618878404e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.67422407237386e-2
n = 50 , left side = 2.24698395749350e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.22028610828007e-2
n = 100 , left side = 6.29476386215339e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.35159531931963e-2
n = 200 , left side = 1.57570456808348e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.29306663788910e-2
n = 500 , left side = 2.52112743802713e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.26517874991616e-2
```

x^3

```
n = 10 , left side = 2.67294554234391e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.72796776073449e-1
n = 20 , left side = 7.37573763765126e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.90654262350665e-2
n = 50 , left side = 3.43473625906568e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.03253380670789e-2
n = 100 , left side = 9.44446042227745e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.03662566330723e-2
n = 200 , left side = 2.36355687722167e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.21428140697528e-2
n = 500 , left side = 3.78169115703986e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25257311272603e-2
```

x^4

```
n = 10 , left side = 1.28630190484472e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.08960410124160e-2
n = 20 , left side = 9.56075627237736e-2
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.72152398878055e-2
n = 50 , left side = 3.63531305456022e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.83195701121335e-2
n = 100 , left side = 9.60960509742477e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.02011119579250e-2
n = 200 , left side = 2.37395330358707e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.21324176433874e-2
n = 500 , left side = 3.78435264452900e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25254649785114e-2
```

x^{10}

```
n = 10 , left side = 1.01874576636765e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.76516548601234e-2
n = 20 , left side = 6.28834473578848e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.99393552536942e-2
n = 50 , left side = 1.34122210673726e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.12604795903631e-2
n = 100 , left side = 1.77904935120004e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.80316677041497e-2
n = 200 , left side = 3.13170903900047e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41932000430745e-2
n = 500 , left side = 4.51983446376149e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28587018983267e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$x^{\frac{1}{3}}$

```
n = 10 , left side = 4.16776482440519e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.57848583252836e-1
n = 20 , left side = 5.57893515050586e-2
          1/n^(7/10) = 1.22822802611579e-1
```

```
          difference = 6.70334511065204e-2
n = 50 , left side = 2.88692145173132e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.58034861404225e-2
n = 100 , left side = 1.51818158365934e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.46289012187563e-2
n = 200 , left side = 7.79143245653994e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.67149384904346e-2
n = 500 , left side = 3.16721387702568e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.73668636593864e-3
```

x

```
n = 10 , left side = 1.39297852044569e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.02283794523193e-2
n = 20 , left side = 1.35053836660812e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.22310340492330e-2
n = 50 , left side = 6.05005534742686e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.17214718346712e-3
n = 100 , left side = 3.02588317119646e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.55188534338509e-3
n = 200 , left side = 1.51294159473203e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 9.37695499965419e-3
n = 500 , left side = 6.05176637892824e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.85213386403609e-3
```

x^2

```
n = 10 , left side = 2.43157400570180e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.36311690732918e-2
n = 20 , left side = 1.86082180257265e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -6.32593776456862e-2
n = 50 , left side = 7.05553949291386e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -5.88269427140289e-3
n = 100 , left side = 3.27751331669406e-2
          1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 7.03558388840909e-3
n = 200 , left side = 1.57584913364196e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 8.74787961055490e-3
n = 500 , left side = 6.15241844118397e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 6.75148180178035e-3
```

x^3

```
n = 10 , left side = 2.71022498896814e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.14962673999257e-2
n = 20 , left side = 1.90670493456831e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -6.78476908452520e-2
n = 50 , left side = 6.18357978326679e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.83690282506788e-3
n = 100 , left side = 2.66415871639060e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.31691298914437e-2
n = 200 , left side = 1.23123014505827e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.21940694963918e-2
n = 500 , left side = 4.69118696759235e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.21271327537197e-3
```

x^4

```
n = 10 , left side = 2.75121623894182e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.55953923972940e-2
n = 20 , left side = 1.76067752001152e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.32449493895734e-2
n = 50 , left side = 4.84096299223661e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.62630707353697e-2
n = 100 , left side = 1.92701557399375e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.05405613154123e-2
n = 200 , left side = 8.55284045364957e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.59535304933249e-2
n = 500 , left side = 3.17966188740908e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.72423835555525e-3
```

$$x^{10}$$

```
n = 10 , left side = 1.93566710892432e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.95952060445629e-3
n = 20 , left side = 7.87869297942849e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.40358728172942e-2
n = 50 , left side = 6.16174359721245e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.85109570605233e-2
n = 100 , left side = 1.28342103628043e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.85272960190693e-2
n = 200 , left side = 4.31090521057667e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40752804259168e-2
n = 500 , left side = 1.37300802767496e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27665994401968e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.77826715380931e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.71743559958795e-1
n = 20 , left side = 2.03819719834504e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02440830628129e-1
n = 50 , left side = 1.35623460940661e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.11103545636696e-2
n = 100 , left side = 7.38362533994837e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.24270917154014e-2
n = 200 , left side = 3.84471652289065e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.06616544240839e-2
n = 500 , left side = 1.57550867898007e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.13283915639843e-2
```

x

```
n = 10 , left side = 4.75511067244829e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.51975124772405e-1
n = 20 , left side = 6.62725962575954e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.65502063539836e-2
n = 50 , left side = 3.02497526014290e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.44229480563067e-2
n = 100 , left side = 1.51294158532012e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.46813012021486e-2
n = 200 , left side = 7.56470797366060e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.69416629733139e-2
n = 500 , left side = 3.02588318946406e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.87801705350026e-3
```

x^2

```
n = 10 , left side = 1.48491297601026e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.10349338958616e-2
n = 20 , left side = 1.05801778974193e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.70210236373860e-2
n = 50 , left side = 3.75629381427749e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.71097625149609e-2
n = 100 , left side = 1.69590196780399e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.28516973773099e-2
n = 200 , left side = 8.02210894257893e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.64842620043956e-2
n = 500 , left side = 3.09906734449100e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.80483289847332e-3
```

x^3

```
n = 10 , left side = 1.74543914391627e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.49823171052614e-2
n = 20 , left side = 1.13936670353400e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.88613225817927e-3
n = 50 , left side = 3.42630249336759e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.04096757240598e-2
n = 100 , left side = 1.41675838910336e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.56431331643161e-2
n = 200 , left side = 6.36914696998986e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.81372239769846e-2
n = 500 , left side = 2.37979755496609e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.05241026879982e-2
```

x^4

```
n = 10 , left side = 1.84936659040297e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.45895724565907e-2
n = 20 , left side = 1.07128649322207e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.56941532893724e-2
n = 50 , left side = 2.75109665690219e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.71617340887139e-2
n = 100 , left side = 1.04742303886479e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.93364866667018e-2
n = 200 , left side = 4.48828977615331e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.00180811708212e-2
n = 500 , left side = 1.62395630266564e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.12799439402987e-2
```

x^{10}

```
n = 10 , left side = 1.25912093995494e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.36141375013944e-2
n = 20 , left side = 4.50714257301664e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.77513768814126e-2
```

```
n = 50 , left side = 3.52635586284471e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.11463447948910e-2
n = 100 , left side = 7.40432630933086e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.90702844244167e-2
n = 200 , left side = 2.39967309324898e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42664036376496e-2
n = 500 , left side = 7.26045349905503e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28312957079738e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 9.41320549975203e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.05394176499368e-1
n = 20 , left side = 2.08852623683860e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.01937540243193e-1
n = 50 , left side = 2.36819069948326e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.23045099582525e-2
n = 100 , left side = 5.70420133082850e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92402969222669e-2
n = 200 , left side = 1.41514784419743e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43648561625548e-2
n = 500 , left side = 2.25952166746170e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28813050262897e-2
```

$$x$$

```
n = 10 , left side = 6.26904457254607e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.36835785771427e-1
n = 20 , left side = 5.31629450327381e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17506508108305e-1
n = 50 , left side = 4.80171447164723e-6
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46678989432641e-2
n = 100 , left side = 4.84497442165832e-11
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170069000e-2
n = 200 , left side = 5.55111512312578e-16
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469739e-2
n = 500 , left side = 5.55111512312578e-16
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429638e-2
```

x^2

```
n = 10 , left side = 5.35412023725638e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.45985029124324e-1
n = 20 , left side = 3.15503410618829e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.12724615496961e-2
n = 50 , left side = 6.39539397083477e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.82773066869010e-2
n = 100 , left side = 1.60070457487843e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.82100124804713e-2
n = 200 , left side = 4.00176162192012e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41061947847825e-2
n = 500 , left side = 6.40281859508596e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28398720570135e-2
```

x^3

```
n = 10 , left side = 8.22514361858364e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.17274795311052e-1
n = 20 , left side = 4.89529007212632e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.38699018903158e-2
n = 50 , left side = 9.59518789082178e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.50775127669140e-2
n = 100 , left side = 2.40105688511857e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.74096601702312e-2
n = 200 , left side = 6.00264243287851e-4
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39061067036867e-2
n = 500 , left side = 9.60422789260673e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28078579640383e-2
```

x^4

```
n = 10 , left side = 1.05428914892154e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.40973166047344e-2
n = 20 , left side = 5.29409198478274e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.98818827637517e-2
n = 50 , left side = 9.76416843272418e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.49085322250116e-2
n = 100 , left side = 2.41169029271288e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.73990267626369e-2
n = 200 , left side = 6.00928831799782e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39054421151747e-2
n = 500 , left side = 9.60592923919812e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28078409505723e-2
```

x^{10}

```
n = 10 , left side = 7.52454953774607e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.24280736119427e-1
n = 20 , left side = 2.44674263826304e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.83553762289486e-2
n = 50 , left side = 1.81340375153014e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.28592969062056e-2
n = 100 , left side = 3.18395629382466e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94923214259673e-2
n = 200 , left side = 7.25568763740292e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44338140706005e-2
n = 500 , left side = 1.13109134075101e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28925893295568e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.53223643819492e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.44203867114939e-1
n = 20 , left side = 3.49587204987340e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.78640821128450e-2
n = 50 , left side = 1.51494072477863e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.95232934099495e-2
n = 100 , left side = 7.78301233322961e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.20277047221201e-2
n = 200 , left side = 3.94613184719019e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.05602390997843e-2
n = 500 , left side = 1.59193781195486e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.13119624310095e-2
```

$$x$$

```
n = 10 , left side = 1.36547896537167e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.29783349597205e-2
n = 20 , left side = 7.54980279853713e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.73247746262077e-2
n = 50 , left side = 3.02588317262263e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.44138689315094e-2
n = 100 , left side = 1.51294159424112e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.46813011129385e-2
n = 200 , left side = 7.56470797120523e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.69416629757693e-2
n = 500 , left side = 3.02588318848207e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.87801705448225e-3
```

x^2

```
n = 10 , left side = 1.90758848287156e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.76738320973161e-3
n = 20 , left side = 9.17539941590603e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.10688084525187e-2
n = 50 , left side = 3.28751331765150e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.17975674812207e-2
n = 100 , left side = 1.57834913272298e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.40272257281200e-2
n = 200 , left side = 7.72822681741009e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.67781441295644e-2
n = 500 , left side = 3.05204620387500e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.85185403908932e-3
```

x^3

```
n = 10 , left side = 1.97902925347756e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.62330614913211e-3
n = 20 , left side = 8.37936441444989e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.90291584670802e-2
n = 50 , left side = 2.68006648218321e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.78720358359037e-2
n = 100 , left side = 1.23509361465025e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.74597809088473e-2
n = 200 , left side = 5.92165438676939e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.85847165602051e-2
n = 500 , left side = 2.30883900335052e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.05950612396138e-2
```

x^4

```
n = 10 , left side = 1.85153292265392e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.43729392314965e-2
n = 20 , left side = 6.85206362278236e-2
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.43021663837554e-2
n = 50 , left side = 1.94398308325003e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.52328698252354e-2
n = 100 , left side = 8.59270484313122e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.12180122122185e-2
n = 200 , left side = 4.03340763113666e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.04729633158378e-2
n = 500 , left side = 1.55255247364129e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.13513477693230e-2
```

$$x^{10}$$

```
n = 10 , left side = 9.18243826815889e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.07701848815299e-1
n = 20 , left side = 1.25940702253738e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.10228732386205e-1
n = 50 , left side = 1.31635223250979e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.33563484252260e-2
n = 100 , left side = 4.36910333828321e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93738067215214e-2
n = 200 , left side = 1.79456804485886e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43269141424886e-2
n = 500 , left side = 6.38762872677155e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28400239556966e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.91510019495543e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.80375229547334e-1
n = 20 , left side = 1.59336570027779e-2
          1/n^(7/10) = 1.22822802611579e-1
```

```
          difference = 1.06889145608801e-1
n = 50 , left side = 7.34958721372491e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.73231134440108e-2
n = 100 , left side = 3.83608528597099e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.59746317693787e-2
n = 200 , left side = 1.95929447787643e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.25470764690981e-2
n = 500 , left side = 7.93772452471505e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.21101277904928e-2
```

x

```
n = 10 , left side = 6.71853998327485e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.32340831664139e-1
n = 20 , left side = 3.77434599317664e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.50793426798126e-2
n = 50 , left side = 1.51294157448426e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.95432849128931e-2
n = 100 , left side = 7.56470791326258e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.22460091420872e-2
n = 200 , left side = 3.78235395663140e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.07240169903431e-2
n = 500 , left side = 1.51294158265236e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.13909586603120e-2
```

x^2

```
n = 10 , left side = 1.09583437523037e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.99427939738512e-2
n = 20 , left side = 4.97548943387787e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.30679082728004e-2
n = 50 , left side = 1.70590195729340e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.76136810848018e-2
n = 100 , left side = 8.04710888143584e-3
          1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 3.17636081739139e-2
n = 200 , left side = 3.90295419867465e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.06034167482999e-2
n = 500 , left side = 1.53223762137955e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.13716626215848e-2
```

x^3

```
n = 10 , left side = 1.19603301353538e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.99229301433499e-2
n = 20 , left side = 4.75552674358074e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.52675351757716e-2
n = 50 , left side = 1.43221226440755e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.03505780136603e-2
n = 100 , left side = 6.40721427687202e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.34035027784777e-2
n = 200 , left side = 3.01892606674667e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.14874448802278e-2
n = 500 , left side = 1.16373090019711e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.17401693427672e-2
```

x^4

```
n = 10 , left side = 1.13906821867757e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.56194096291311e-2
n = 20 , left side = 3.98786122663639e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.29441903452151e-2
n = 50 , left side = 1.06344157621009e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.40382848956348e-2
n = 100 , left side = 4.52699368658457e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.52837233687652e-2
n = 200 , left side = 2.07465246994464e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.24317184770299e-2
n = 500 , left side = 7.85577558848657e-4
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.21183226841157e-2
```

$$x^{10}$$

```
n = 10 , left side = 5.29211012151615e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.46605130281727e-1
n = 20 , left side = 7.17078983774001e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.15652012773839e-1
n = 50 , left side = 7.66797573539473e-4
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.39059030841963e-2
n = 100 , left side = 2.45144088786614e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.95655729665631e-2
n = 200 , left side = 9.64420952325753e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44099288517419e-2
n = 500 , left side = 3.30218040759560e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28708784388884e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.31080546426938e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.76418176854194e-1
n = 20 , left side = 4.10160849244644e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.18721194119133e-1
n = 50 , left side = 6.06223868247818e-4
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.40664767894879e-2
n = 100 , left side = 1.50365684624608e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.96603513707251e-2
n = 200 , left side = 3.75195778786654e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44688513690958e-2
n = 500 , left side = 5.99994079339079e-6
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28979003021709e-2
```

x

```
n = 10 , left side = 4.77404467351350e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.94752186823375e-1
n = 20 , left side = 4.28164266844111e-5
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22779986184895e-1
n = 50 , left side = 4.20337098461232e-11
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006157020e-2
n = 100 , left side = 2.77555756156289e-16
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553495e-2
n = 200 , left side = 1.11022302462516e-16
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469744e-2
n = 500 , left side = 1.11022302462516e-16
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429642e-2
```

x^2

```
n = 10 , left side = 3.47804623718355e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.64745769125052e-1
n = 20 , left side = 1.05621876851442e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.12260614926435e-1
n = 50 , left side = 1.70070460099492e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.29719960567408e-2
n = 100 , left side = 4.25176166336694e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93855408890130e-2
n = 200 , left side = 1.06294041584243e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44000769053903e-2
n = 500 , left side = 1.70070466533612e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28868931963110e-2
```

x^3

```
n = 10 , left side = 5.34512523933044e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.46074979103584e-1
n = 20 , left side = 1.58604436590267e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.06962358952552e-1
n = 50 , left side = 2.55105692100369e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.21216437367321e-2
n = 100 , left side = 6.37764249505235e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.91729528058445e-2
n = 200 , left side = 1.59441062376225e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43469298845983e-2
n = 500 , left side = 2.55105699802083e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28783896729841e-2
```

x^4

```
n = 10 , left side = 5.79537249830057e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.41572506513882e-1
n = 20 , left side = 1.63005294377560e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.06522273173823e-1
n = 50 , left side = 2.56266075189858e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.21100399058372e-2
n = 100 , left side = 6.38489489432709e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.91722275659170e-2
n = 200 , left side = 1.59486389871732e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43468845571028e-2
n = 500 , left side = 2.55117303640667e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28783885126003e-2
```

x^{10}

```
n = 10 , left side = 2.89748111254213e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.70551420371467e-1
n = 20 , left side = 3.81120751926907e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19011595092310e-1
```

```
n = 50 , left side = 3.39375579818669e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.43333250779171e-2
n = 100 , left side = 7.71537611494772e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97335632942003e-2
n = 200 , left side = 1.88337914884282e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44875371554861e-2
n = 500 , left side = 2.99332972483377e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29009069132395e-2


-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 7.33574282376018e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.27829805389671e-1
n = 20 , left side = 4.53841801182795e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.61706351418625e-1
n = 50 , left side = 4.74957712877522e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.61753723423239e-1
n = 100 , left side = 2.67013950556250e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.24487248095333e-1
n = 200 , left side = 1.39773905392248e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90051186797612e-1
n = 500 , left side = 5.75326859927561e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49238630155558e-1
```

$$x$$

```
n = 10 , left side = 1.48505389324611e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.86336694694811e-1
n = 20 , left side = 1.39174879467005e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.67915652069900e-1
n = 50 , left side = 1.07608816899146e-1
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.01640677811846e-1
n = 100 , left side = 5.54452812788875e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.95743361872071e-1
n = 200 , left side = 2.77258871979469e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.76302690138890e-1
n = 500 , left side = 1.10903548889590e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.43901543865875e-1
```

x^2

```
n = 10 , left side = 1.94005188391137e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.07182045236135e-1
n = 20 , left side = 2.30868040947246e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.76222490589658e-1
n = 50 , left side = 1.38886956653740e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.70362538057252e-1
n = 100 , left side = 6.38134518553902e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.87375191295568e-1
n = 200 , left side = 2.98188925936176e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.74209684743219e-1
n = 500 , left side = 1.14252357544120e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.43566663000422e-1
```

x^3

```
n = 10 , left side = 2.06175421900514e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.95011811726758e-1
n = 20 , left side = 2.53575282932135e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.53515248604770e-1
n = 50 , left side = 1.34595194359457e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.74654300351535e-1
n = 100 , left side = 5.51857590364190e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.96002884114539e-1
n = 200 , left side = 2.40653876252186e-2
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.79963189711618e-1
n = 500 , left side = 8.82850116987993e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.46163397584954e-1
```

x^4

```
n = 10 , left side = 2.45980444406422e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.55206789220850e-1
n = 20 , left side = 2.51901006172595e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.55189525364309e-1
n = 50 , left side = 1.17335729825916e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.91913764885076e-1
n = 100 , left side = 4.25973806719297e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.08591262479028e-1
n = 200 , left side = 1.72794180717636e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.86749159265073e-1
n = 500 , left side = 6.06468552840350e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.48927213226430e-1
```

x^{10}

```
n = 10 , left side = 1.88296929722229e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.12890303905043e-1
n = 20 , left side = 1.57124987034018e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.49965544502886e-1
n = 50 , left side = 3.56919049916328e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.73557589719359e-1
n = 100 , left side = 4.80555765395135e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46383085497007e-1
n = 200 , left side = 1.09199033498755e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02936587001849e-1
n = 500 , left side = 2.84658201772788e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54707240553061e-1
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.26504552641874e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.74682680985398e-1
n = 20 , left side = 2.03548587742321e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86735672762672e-1
n = 50 , left side = 2.03304570248789e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.88919037686113e-1
n = 100 , left side = 1.26409079150101e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38547735235948e-1
n = 200 , left side = 6.81868079261327e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97209896544224e-1
n = 500 , left side = 2.84988268112440e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52142016073709e-1
```

$$x$$

```
n = 10 , left side = 8.02267409115547e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.20960492715718e-1
n = 20 , left side = 5.14929405767164e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.55597590960188e-1
n = 50 , left side = 5.36143926388593e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.55635102072132e-1
n = 100 , left side = 2.77224568458395e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23466186305118e-1
n = 200 , left side = 1.38629435986317e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90165633738205e-1
n = 500 , left side = 5.54517744447958e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446721310354e-1
```

x^2

```
n = 10 , left side = 1.28296366461717e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72890867165555e-1
n = 20 , left side = 1.38397942935223e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.68692588601681e-1
n = 50 , left side = 7.67416652503928e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.32507829460599e-1
n = 100 , left side = 3.37863631986789e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.17402279952279e-1
n = 200 , left side = 1.53794053842904e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88649171952547e-1
n = 500 , left side = 5.78781133126016e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49204087423574e-1
```

x^3

```
n = 10 , left side = 1.27831704419723e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.73355529207549e-1
n = 20 , left side = 1.61344011208260e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.45746520328645e-1
n = 50 , left side = 7.78602100423141e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.31389284668678e-1
n = 100 , left side = 3.03485286276982e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.20840114523260e-1
n = 200 , left side = 1.27296398524400e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.91298937484397e-1
n = 500 , left side = 4.52652924015573e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50465369514678e-1
```

x^4

```
n = 10 , left side = 1.84494512877635e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.16692720749638e-1
n = 20 , left side = 1.66506805511951e-1
```

```
                1/n^(3/10) = 4.07090531536904e-1
                difference = 2.40583726024953e-1
        n = 50 , left side = 6.92290642748952e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.40020430436097e-1
        n = 100 , left side = 2.40205845419830e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.27168058608975e-1
        n = 200 , left side = 9.33054650504626e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.94698030831791e-1
        n = 500 , left side = 3.14415812448718e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.51847740630347e-1
```

$$x^{10}$$

```
        n = 10 , left side = 1.40771586828727e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.60415646798545e-1
        n = 20 , left side = 1.00214745282116e-1
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.06875786254789e-1
        n = 50 , left side = 1.99853845577976e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.89264110153194e-1
        n = 100 , left side = 2.75646208624232e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.48432181064716e-1
        n = 200 , left side = 6.26624240120737e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03401953096716e-1
        n = 500 , left side = 1.55217235579003e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54836681519255e-1


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 2.09749541545875e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 2.91437692081397e-1
        n = 20 , left side = 7.85812770396357e-2
                1/n^(3/10) = 4.07090531536904e-1
```

```
          difference = 3.28509254497269e-1
n = 50 , left side = 9.34393044496793e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99905564266024e-1
n = 100 , left side = 1.94070471300632e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49247938437952e-1
n = 200 , left side = 4.71100029514449e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03557477307323e-1
n = 500 , left side = 7.48422627478984e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54917056492086e-1
```

x

```
n = 10 , left side = 2.08951638220122e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.92235595407150e-1
n = 20 , left side = 5.25889244914823e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.54501607045422e-1
n = 50 , left side = 1.01379455384015e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08235700157152e-1
n = 100 , left side = 1.80708522862227e-6
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51186836065729e-1
n = 200 , left side = 6.45494768747312e-12
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577330382e-1
n = 500 , left side = 1.11022302462516e-16
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 6.09251809834973e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.40262052643775e-1
n = 20 , left side = 4.57428235934710e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.61347707943433e-1
n = 50 , left side = 1.96014797649489e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.89648014946043e-1
n = 100 , left side = 5.29434230595238e-3
          1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.45894300845006e-1
n = 200 , left side = 1.32428057699485e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02704296759842e-1
n = 500 , left side = 2.11884893889736e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54780013860944e-1
```

x^3

```
n = 10 , left side = 3.81659578000773e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.63021275827195e-1
n = 20 , left side = 7.43081431790645e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.32782388357840e-1
n = 50 , left side = 2.97879650699726e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79461529641019e-1
n = 100 , left side = 7.94232255998331e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43246320590975e-1
n = 200 , left side = 1.98642086856271e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02042156468274e-1
n = 500 , left side = 3.17827340834881e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54674071413999e-1
```

x^4

```
n = 10 , left side = 1.25757444757586e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.75429788869686e-1
n = 20 , left side = 9.19703672747022e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.15120164262202e-1
n = 50 , left side = 3.13124123712135e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.77937082339778e-1
n = 100 , left side = 8.05935138518928e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43129291765769e-1
n = 200 , left side = 1.99376000196876e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02034817334868e-1
n = 500 , left side = 3.18015222677673e-4
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54673883532156e-1
```

$$x^{10}$$

```
        n = 10 , left side = 9.92211518367572e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.01966081790515e-1
        n = 20 , left side = 5.87860822296066e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.48304449307298e-1
        n = 50 , left side = 1.06402237950818e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.98609270915910e-1
        n = 100 , left side = 1.39397823915502e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.49794664911803e-1
        n = 200 , left side = 2.58092754852007e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03770484581985e-1
        n = 500 , left side = 3.78668260720162e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54954031928762e-1


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 4.65939350634127e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.54593298563860e-1
        n = 20 , left side = 5.39175273339060e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.53173004202998e-1
        n = 50 , left side = 2.66706958509519e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.82578798860040e-1
        n = 100 , left side = 1.39692422376499e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.37219400913308e-1
        n = 200 , left side = 7.15466879542803e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.96873908541409e-1
        n = 500 , left side = 2.90466167844949e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52087237076384e-1
```

x

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.54226692118394e-1
n = 20 , left side = 1.28044818944893e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.79045712592012e-1
n = 50 , left side = 5.54458428059438e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53803651905048e-1
n = 100 , left side = 2.77258872001896e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23462755950768e-1
n = 200 , left side = 1.38629436111991e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90165633725638e-1
n = 500 , left side = 5.54517744447969e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446721310354e-1
```

x^2

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.57118276412179e-1
n = 20 , left side = 1.73393496362237e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.33697035174668e-1
n = 50 , left side = 6.39143140576404e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.45335180653351e-1
n = 100 , left side = 2.98438925970290e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.21344750553929e-1
n = 200 , left side = 1.43924449634691e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.89636132373368e-1
n = 500 , left side = 5.62989766084271e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49362001093991e-1
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.30655152140317e-1
n = 20 , left side = 1.75303858260733e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.31786673276172e-1
n = 50 , left side = 5.53534166881953e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53896078022796e-1
n = 100 , left side = 2.41049670707778e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.27083676080180e-1
n = 200 , left side = 1.12081526845384e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.92820424652299e-1
n = 500 , left side = 4.28703175655956e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50704866998274e-1
```

x^4

```
n = 10 , left side = 2.71811655321144e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.29375578306128e-1
n = 20 , left side = 1.59700780897926e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.47389750638979e-1
n = 50 , left side = 4.27867893894553e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.66462705321536e-1
n = 100 , left side = 1.73213915349857e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.33867251615972e-1
n = 200 , left side = 7.76000677274198e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96268570564095e-1
n = 500 , left side = 2.90182870840228e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52090070046431e-1
```

x^{10}

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.14336410295721e-1
n = 20 , left side = 6.58347789205074e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.41255752616397e-1
```

```
n = 50 , left side = 4.87085072187453e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04378643989117e-1
n = 100 , left side = 1.09970741431004e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50088935736648e-1
n = 200 , left side = 3.82804893814671e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03645772443022e-1
n = 500 , left side = 1.24276968148370e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54867621786685e-1


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96080052578451e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.81579228369427e-1
n = 20 , left side = 2.08299179386357e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86260613598269e-1
n = 50 , left side = 1.26071386109584e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96642356100033e-1
n = 100 , left side = 6.81015763376203e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44378485517196e-1
n = 200 , left side = 3.53432821873112e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00494249118106e-1
n = 500 , left side = 1.44549650366466e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53546402251169e-1
```

$$x$$

```
n = 10 , left side = 5.68097172543791e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.44377516372893e-1
n = 20 , left side = 6.32752819000136e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.43815249636891e-1
n = 50 , left side = 2.77227554082916e-2
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81526739302700e-1
n = 100 , left side = 1.38629435997857e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37325699551172e-1
n = 200 , left side = 6.93147180559928e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097105531238e-1
n = 500 , left side = 2.77258872223984e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219310032594e-1
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.53314481216394e-1
n = 20 , left side = 9.78605569036921e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.09229974633212e-1
n = 50 , left side = 3.38868135786705e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.75362681132321e-1
n = 100 , left side = 1.54044053860310e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.35784237764927e-1
n = 200 , left side = 7.31683725369431e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96711740083143e-1
n = 500 , left side = 2.83424719393505e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52157651560899e-1
```

x^3

```
n = 10 , left side = 1.73192000431425e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.27995233195847e-1
n = 20 , left side = 1.03864925521532e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.03225606015373e-1
n = 50 , left side = 3.05073733511566e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.78742121359835e-1
n = 100 , left side = 1.27681795752465e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38420463575711e-1
n = 200 , left side = 5.78399942625285e-3
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98244577910584e-1
n = 500 , left side = 2.17239948281686e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52819499272017e-1
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.20929878931060e-1
n = 20 , left side = 9.63498090064419e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.10740722530462e-1
n = 50 , left side = 2.41914336230854e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.85058061087906e-1
n = 100 , left side = 9.37035404303936e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41818289107919e-1
n = 200 , left side = 4.05904957310239e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99969527763735e-1
n = 500 , left side = 1.47973714572867e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53512161609105e-1
```

x^{10}

```
n = 10 , left side = 1.19260700953333e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.81926532673939e-1
n = 20 , left side = 3.73465208237526e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69744010713152e-1
n = 50 , left side = 2.80162956157202e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06447865149420e-1
n = 100 , left side = 6.32905221145905e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50555737929812e-1
n = 200 , left side = 2.12043953336255e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03816533383501e-1
n = 500 , left side = 6.54808182457849e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54926417936588e-1
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 8.10134985303518e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.20173735096921e-1
n = 20 , left side = 1.68560763315222e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90234455205382e-1
n = 50 , left side = 1.97802106438810e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07271473646604e-1
n = 100 , left side = 4.80026592953875e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50708616558004e-1
n = 200 , left side = 1.19239646471203e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909337690366e-1
n = 500 , left side = 1.90449720901542e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972853782744e-1
```

$$x$$

```
n = 10 , left side = 4.91637605442458e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.52023473083027e-1
n = 20 , left side = 3.39394250680031e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03696589030104e-1
n = 50 , left side = 1.64890433862475e-6
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09247845806653e-1
n = 100 , left side = 5.86131143620605e-12
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643145097e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 1.11022302462516e-16
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 5.25230782287648e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.48664155398508e-1
n = 20 , left side = 2.83373415030339e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.78753190033871e-1
n = 50 , left side = 5.39457664221715e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03854918068775e-1
n = 100 , left side = 1.34928057788158e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49839362573076e-1
n = 200 , left side = 3.37320146703013e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03691257190134e-1
n = 500 , left side = 5.39712234723932e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54937927531361e-1
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.18963782998903e-1
n = 20 , left side = 4.36057626242194e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.63484768912685e-1
n = 50 , left side = 8.09259320656255e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01156901504429e-1
n = 100 , left side = 2.02392086959330e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49164722281365e-1
n = 200 , left side = 5.05980220054492e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03522597116782e-1
n = 500 , left side = 8.09568352087287e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54910941919625e-1
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.00134260333711e-1
n = 20 , left side = 4.67481413489400e-2
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.60342390187964e-1
n = 50 , left side = 8.21282675171921e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01036667959273e-1
n = 100 , left side = 2.03145927015687e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49157183880801e-1
n = 200 , left side = 5.06451370153274e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03522125966684e-1
n = 500 , left side = 8.09688966512401e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54910929858182e-1
```

$$x^{10}$$

```
n = 10 , left side = 7.01207124827066e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.31066521144566e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86933061112271e-1
n = 50 , left side = 1.42480124701178e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07824693463980e-1
n = 100 , left side = 2.63178146244829e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50925465004713e-1
n = 200 , left side = 6.08599933530623e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03967717343484e-1
n = 500 , left side = 9.52678517993620e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54982371969654e-1


-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.33369660315084e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.47850267595764e-1
n = 20 , left side = 3.23728371506256e-2
          1/n^(3/10) = 4.07090531536904e-1
```

```
          difference = 3.74717694386279e-1
n = 50 , left side = 1.39366391997126e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95312855511279e-1
n = 100 , left side = 7.14621856758912e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44042424583369e-1
n = 200 , left side = 3.61961230894114e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00408965027896e-1
n = 500 , left side = 1.45930076253686e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53532597992297e-1
```

x

```
n = 10 , left side = 1.29071817455777e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72115416171495e-1
n = 20 , left side = 6.92514035886481e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.37839127948256e-1
n = 50 , left side = 2.77258876437845e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81523607067207e-1
n = 100 , left side = 1.38629438314651e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37325699319493e-1
n = 200 , left side = 6.93147191573262e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097105421104e-1
n = 500 , left side = 2.77258876629316e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219309988541e-1
```

x^2

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.23796320108465e-1
n = 20 , left side = 8.30737213816239e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.24016810155280e-1
n = 50 , left side = 2.99438930027937e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79305601708198e-1
n = 100 , left side = 1.44174451738843e-2
          1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.36771197977074e-1
n = 200 , left side = 7.07009725133734e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96958480085500e-1
n = 500 , left side = 2.79476881998975e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52197129934844e-1
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.19480393609674e-1
n = 20 , left side = 7.48642399521750e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.32226291584729e-1
n = 50 , left side = 2.42632851043289e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.84986209606663e-1
n = 100 , left side = 1.12466925545659e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.39941950596392e-1
n = 200 , left side = 5.40875852362382e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98619818813213e-1
n = 500 , left side = 2.11285351660367e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52879045238230e-1
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.33400055557578e-1
n = 20 , left side = 6.03397370785073e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.46750794458397e-1
n = 50 , left side = 1.74893080184917e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.91760186692500e-1
n = 100 , left side = 7.79966635748700e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43388976793471e-1
n = 200 , left side = 3.67816819644862e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00350409140388e-1
n = 500 , left side = 1.41984974971862e-3
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53572049005115e-1
```

$$x^{10}$$

```
        n = 10 , left side = 7.68027797084296e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.24384453918843e-1
        n = 20 , left side = 9.76146773173468e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.97329063805170e-1
        n = 50 , left side = 1.13068528957835e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08118809421413e-1
        n = 100 , left side = 3.88474877995735e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50800168272962e-1
        n = 200 , left side = 1.62038602246190e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03866538734591e-1
        n = 500 , left side = 5.81892063839355e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54933709548450e-1


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.96445247579276e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.81542708869345e-1
        n = 20 , left side = 1.48888789279412e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.92201652608963e-1
        n = 50 , left side = 6.77605354912036e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.02473441161871e-1
        n = 100 , left side = 3.52568356510696e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.47662959585851e-1
        n = 200 , left side = 1.79801315131500e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.02230564185522e-1
        n = 500 , left side = 7.27768804897111e-4
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54264129949937e-1
```

x

```
n = 10 , left side = 6.38935662496245e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37293667377648e-1
n = 20 , left side = 3.46235470985202e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72466984438384e-1
n = 50 , left side = 1.38629429714336e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95386551739558e-1
n = 100 , left side = 6.93147149063489e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44257171660323e-1
n = 200 , left side = 3.46573574531750e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00562841591519e-1
n = 500 , left side = 1.38629429812676e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53605604456707e-1
```

x^2

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.99956038458589e-1
n = 20 , left side = 4.48623512045706e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62228180332334e-1
n = 50 , left side = 1.55044047114583e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.93745089999533e-1
n = 100 , left side = 7.34183692697749e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43846806223981e-1
n = 200 , left side = 3.56832710440308e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00460250232434e-1
n = 500 , left side = 1.40270891558070e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53589189839253e-1
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.92136053485582e-1
n = 20 , left side = 4.22970110547812e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.64793520482123e-1
n = 50 , left side = 1.29223379237351e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96327156787257e-1
n = 100 , left side = 5.82201903348836e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.45366624117470e-1
n = 200 , left side = 2.75417225524133e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01274405081596e-1
n = 500 , left side = 1.06440558786375e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53927493166970e-1
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.98646348945873e-1
n = 20 , left side = 3.49981874860215e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72092344050883e-1
n = 50 , left side = 9.52960631552967e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99719888395462e-1
n = 100 , left side = 4.09764755001943e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47090995600939e-1
n = 200 , left side = 1.88876104704877e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02139816289788e-1
n = 500 , left side = 7.17895958025142e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54274002796809e-1
```

x^{10}

```
n = 10 , left side = 4.39432749437960e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.57243958683476e-1
n = 20 , left side = 5.59881198565943e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01491719551245e-1
```

```
n = 50 , left side = 6.58122885628528e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08591371825363e-1
n = 100 , left side = 2.17135216419734e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50971507934538e-1
n = 200 , left side = 8.67799400495889e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03941797396787e-1
n = 500 , left side = 3.00238003034161e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54961874954530e-1


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245116e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.82328897802761e-1
n = 20 , left side = 3.43036193768773e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03660169599217e-1
n = 50 , left side = 5.15745217625319e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08733749493366e-1
n = 100 , left side = 1.28085535783029e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060557615175e-1
n = 200 , left side = 3.19697272260777e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996607609611e-1
n = 500 , left side = 5.11285838644682e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986785896447e-1
```

$$x$$

```
n = 10 , left side = 3.03097878388942e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.98156254843383e-1
n = 20 , left side = 1.79813965207609e-5
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07072550140384e-1
n = 50 , left side = 5.04990493865876e-12
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494705942e-1
n = 100 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 3.13288100022529e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.69858423625019e-1
n = 20 , left side = 9.02981956494570e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.98060711971959e-1
n = 50 , left side = 1.44928066358063e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07800214047411e-1
n = 100 , left side = 3.62320167826224e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50826322983132e-1
n = 200 , left side = 9.05800419565006e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03937997294880e-1
n = 500 , left side = 1.44928067130623e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54977405948121e-1
```

x^3

```
n = 10 , left side = 4.78600213916088e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.53327212235664e-1
n = 20 , left side = 1.35520533206199e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93538478216285e-1
n = 50 , left side = 2.17392099772562e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07075573713266e-1
n = 100 , left side = 5.43480251739253e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50645162899219e-1
n = 200 , left side = 1.35870062934917e-4
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03892707273902e-1
n = 500 , left side = 2.17392100695379e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54970159544764e-1
```

x^4

```
n = 10 , left side = 5.14533906505906e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.49733842976682e-1
n = 20 , left side = 1.38732244570933e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93217307079811e-1
n = 50 , left side = 2.18227896612348e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07067215744868e-1
n = 100 , left side = 5.44002624822709e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50644640526135e-1
n = 200 , left side = 1.35902711252578e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03892674625584e-1
n = 500 , left side = 2.17400458664557e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54970158708967e-1
```

x^{10}

```
n = 10 , left side = 2.39574413183784e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.77229792308894e-1
n = 20 , left side = 2.97086004062662e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.04119671496278e-1
n = 50 , left side = 2.83599622557859e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08965895088434e-1
n = 100 , left side = 6.54249762594714e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51123218174699e-1
n = 200 , left side = 1.60297404174898e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04012547596419e-1
n = 500 , left side = 2.55030753054338e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54989348447303e-1
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 7.33574282376018e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.42870337779236e-1
n = 20 , left side = 4.53841801182795e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78222617631699e-1
n = 50 , left side = 4.74957712877522e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.39255849495573e-2
n = 100 , left side = 2.67013950556250e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.32986049443750e-2
n = 200 , left side = 1.39773905392248e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.67332875794300e-2
n = 500 , left side = 5.75326859927561e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.89680909507202e-2
```

$$x$$

```
n = 10 , left side = 1.48505389324611e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.01377227084377e-1
n = 20 , left side = 1.39174879467005e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.44319182829743e-2
n = 50 , left side = 1.07608816899146e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 3.38125393381637e-2
n = 100 , left side = 5.54452812788875e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.45547187211125e-2
n = 200 , left side = 2.77258871979469e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.29847909207079e-2
n = 500 , left side = 1.10903548889590e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.36310046610368e-2
```

x^2

```
n = 10 , left side = 1.94005188391137e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.22222577625701e-1
n = 20 , left side = 2.30868040947246e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -7.26124319726743e-3
n = 50 , left side = 1.38886956653740e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 2.53439958356949e-3
n = 100 , left side = 6.38134518553902e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 3.61865481446098e-2
n = 200 , left side = 2.98188925936176e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.08917855250372e-2
n = 500 , left side = 1.14252357544120e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.32961237955838e-2
```

x^3

```
n = 10 , left side = 2.06175421900514e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.10052344116324e-1
n = 20 , left side = 2.53575282932135e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.99684851821559e-2
n = 50 , left side = 1.34595194359457e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.82616187785273e-3
n = 100 , left side = 5.51857590364190e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.48142409635810e-2
n = 200 , left side = 2.40653876252186e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.66452904934361e-2
n = 500 , left side = 8.82850116987993e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.58928583801159e-2
```

x^4

```
n = 10 , left side = 2.45980444406422e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.02473216104161e-2
n = 20 , left side = 2.51901006172595e-1
```

```
                1/n^(1/2) = 2.23606797749979e-1
                difference = -2.82942084226161e-2
        n = 50 , left side = 1.17335729825916e-1
                1/n^(1/2) = 1.41421356237310e-1
                difference = 2.40856264113940e-2
        n = 100 , left side = 4.25973806719297e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 5.74026193280703e-2
        n = 200 , left side = 1.72794180717636e-2
                1/n^(1/2) = 7.07106781186548e-2
                difference = 5.34312600468912e-2
        n = 500 , left side = 6.06468552840350e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 3.86566740215923e-2
```

$$x^{10}$$

```
        n = 10 , left side = 1.88296929722229e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.27930836294609e-1
        n = 20 , left side = 1.57124987034018e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = 6.64818107159607e-2
        n = 50 , left side = 3.56919049916328e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.05729451245677e-1
        n = 100 , left side = 4.80555765395135e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.51944423460487e-2
        n = 200 , left side = 1.09199033498755e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.96186877836672e-2
        n = 500 , left side = 2.84658201772788e-4
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.44367013482230e-2


-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.26504552641874e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.89723213374964e-1
        n = 20 , left side = 2.03548587742321e-2
                1/n^(1/2) = 2.23606797749979e-1
```

```
          difference = 2.03251938975747e-1
n = 50 , left side = 2.03304570248789e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21090899212431e-1
n = 100 , left side = 1.26409079150101e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.73590920849900e-2
n = 200 , left side = 6.81868079261327e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.38919973260415e-2
n = 500 , left side = 2.84988268112440e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18714768688714e-2
```

x

```
n = 10 , left side = 8.02267409115547e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.36001025105283e-1
n = 20 , left side = 5.14929405767164e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.72113857173263e-1
n = 50 , left side = 5.36143926388593e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.78069635984502e-2
n = 100 , left side = 2.77224568458395e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.22775431541605e-2
n = 200 , left side = 1.38629435986317e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68477345200230e-2
n = 500 , left side = 5.54517744447958e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91761821055162e-2
```

x^2

```
n = 10 , left side = 1.28296366461717e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87931399555121e-1
n = 20 , left side = 1.38397942935223e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.52088548147560e-2
n = 50 , left side = 7.67416652503928e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.46796909869167e-2
n = 100 , left side = 3.37863631986789e-2
          1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 6.62136368013211e-2
n = 200 , left side = 1.53794053842904e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.53312727343644e-2
n = 500 , left side = 5.78781133126016e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.89335482187356e-2
```

x^3

```
n = 10 , left side = 1.27831704419723e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.88396061597115e-1
n = 20 , left side = 1.61344011208260e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.22627865417190e-2
n = 50 , left side = 7.78602100423141e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 6.35611461949954e-2
n = 100 , left side = 3.03485286276982e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.96514713723018e-2
n = 200 , left side = 1.27296398524400e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.79810382662148e-2
n = 500 , left side = 4.52652924015573e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.01948303098401e-2
```

x^4

```
n = 10 , left side = 1.84494512877635e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.31733253139203e-1
n = 20 , left side = 1.66506805511951e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 5.70999922380280e-2
n = 50 , left side = 6.92290642748952e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.21922919624143e-2
n = 100 , left side = 2.40205845419830e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.59794154580170e-2
n = 200 , left side = 9.33054650504626e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.13801316136085e-2
n = 500 , left side = 3.14415812448718e-3
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.15772014255086e-2
```

$$x^{10}$$

```
        n = 10 , left side = 1.40771586828727e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.75456179188111e-1
        n = 20 , left side = 1.00214745282116e-1
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.23392052467863e-1
        n = 50 , left side = 1.99853845577976e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.21435971679512e-1
        n = 100 , left side = 2.75646208624232e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.72435379137577e-2
        n = 200 , left side = 6.26624240120737e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.00840538785340e-2
        n = 500 , left side = 1.55217235579003e-4
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.45661423144168e-2


--------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 2.09749541545875e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.06478224470963e-1
        n = 20 , left side = 7.85812770396357e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.45025520710343e-1
        n = 50 , left side = 9.34393044496793e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.32077425792342e-1
        n = 100 , left side = 1.94070471300632e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.80592952869937e-2
        n = 200 , left side = 4.71100029514449e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.02395780891403e-2
        n = 500 , left side = 7.48422627478984e-5
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46465172872479e-2
```

x

```
n = 10 , left side = 2.08951638220122e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.07276127796716e-1
n = 20 , left side = 5.25889244914823e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.71017873258497e-1
n = 50 , left side = 1.01379455384015e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40407561683469e-1
n = 100 , left side = 1.80708522862227e-6
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99981929147714e-2
n = 200 , left side = 6.45494768747312e-12
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781121998e-2
n = 500 , left side = 1.11022302462516e-16
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

x^2

```
n = 10 , left side = 6.09251809834973e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.55302585033341e-1
n = 20 , left side = 4.57428235934710e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.77863974156508e-1
n = 50 , left side = 1.96014797649489e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21819876472361e-1
n = 100 , left side = 5.29434230595238e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.47056576940476e-2
n = 200 , left side = 1.32428057699485e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.93863975416599e-2
n = 500 , left side = 2.11884893889736e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45094746561061e-2
```

x^3

```
n = 10 , left side = 3.81659578000773e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.78061808216761e-1
n = 20 , left side = 7.43081431790645e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.49298654570915e-1
n = 50 , left side = 2.97879650699726e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11633391167337e-1
n = 100 , left side = 7.94232255998331e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.20576774400167e-2
n = 200 , left side = 1.98642086856271e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.87242572500920e-2
n = 500 , left side = 3.17827340834881e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44035322091609e-2
```

x^4

```
n = 10 , left side = 1.25757444757586e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.90470321259252e-1
n = 20 , left side = 9.19703672747022e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.31636430475277e-1
n = 50 , left side = 3.13124123712135e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.10108943866096e-1
n = 100 , left side = 8.05935138518928e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.19406486148107e-2
n = 200 , left side = 1.99376000196876e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.87169181166860e-2
n = 500 , left side = 3.18015222677673e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44033443273181e-2
```

x^{10}

```
n = 10 , left side = 9.92211518367572e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.17006614180081e-1
n = 20 , left side = 5.87860822296066e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.64820715520372e-1
```

```
n = 50 , left side = 1.06402237950818e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.30781132442228e-1
n = 100 , left side = 1.39397823915502e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.86060217608450e-2
n = 200 , left side = 2.58092754852007e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04525853638027e-2
n = 500 , left side = 3.78668260720162e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46834927239238e-2


--------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.65939350634127e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.69633830953425e-1
n = 20 , left side = 5.39175273339060e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.69689270416073e-1
n = 50 , left side = 2.66706958509519e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.14750660386358e-1
n = 100 , left side = 1.39692422376499e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.60307577623501e-2
n = 200 , left side = 7.15466879542803e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.35560093232267e-2
n = 500 , left side = 2.90466167844949e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18166978715463e-2
```

$$x$$

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.69267224507959e-1
n = 20 , left side = 1.28044818944893e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 9.55619788050862e-2
n = 50 , left side = 5.54458428059438e-2
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.59755134313657e-2
n = 100 , left side = 2.77258872001896e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.22741127998104e-2
n = 200 , left side = 1.38629436111991e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68477345074556e-2
n = 500 , left side = 5.54517744447969e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91761821055161e-2
```

x^2

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.21588088017443e-2
n = 20 , left side = 1.73393496362237e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 5.02133013877420e-2
n = 50 , left side = 6.39143140576404e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.75070421796691e-2
n = 100 , left side = 2.98438925970290e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.01561074029710e-2
n = 200 , left side = 1.43924449634691e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.63182331551856e-2
n = 500 , left side = 5.62989766084271e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.90914618891531e-2
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.56956845298822e-2
n = 20 , left side = 1.75303858260733e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 4.83029394892462e-2
n = 50 , left side = 5.53534166881953e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.60679395491142e-2
n = 100 , left side = 2.41049670707778e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.58950329292222e-2
n = 200 , left side = 1.12081526845384e-2
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.95025254341163e-2
n = 500 , left side = 4.28703175655956e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.04343277934362e-2
```

x^4

```
n = 10 , left side = 2.71811655321144e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.44161106956936e-2
n = 20 , left side = 1.59700780897926e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.39060168520534e-2
n = 50 , left side = 4.27867893894553e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.86345668478542e-2
n = 100 , left side = 1.73213915349857e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.26786084650143e-2
n = 200 , left side = 7.76000677274198e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.29506713459128e-2
n = 500 , left side = 2.90182870840228e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18195308415935e-2
```

x^{10}

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.29376942685286e-1
n = 20 , left side = 6.58347789205074e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.57772018829472e-1
n = 50 , left side = 4.87085072187453e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36550505515435e-1
n = 100 , left side = 1.09970741431004e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.89002925856900e-2
n = 200 , left side = 3.82804893814671e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03278732248401e-2
n = 500 , left side = 1.24276968148370e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45970825818474e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96080052578451e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96619760758993e-1
n = 20 , left side = 2.08299179386357e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.02776879811343e-1
n = 50 , left side = 1.26071386109584e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28814217626351e-1
n = 100 , left side = 6.81015763376203e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.31898423662380e-2
n = 200 , left side = 3.53432821873112e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.71763498999236e-2
n = 500 , left side = 1.44549650366466e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32758630463311e-2
```

$$x$$

```
n = 10 , left side = 5.68097172543791e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.59418048762459e-1
n = 20 , left side = 6.32752819000136e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.60331515849965e-1
n = 50 , left side = 2.77227554082916e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13698600829018e-1
n = 100 , left side = 1.38629435997857e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61370564002143e-2
n = 200 , left side = 6.93147180559928e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37792063130555e-2
n = 500 , left side = 2.77258872223984e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487708277560e-2
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.68355013605960e-1
n = 20 , left side = 9.78605569036921e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.25746240846287e-1
n = 50 , left side = 3.38868135786705e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.07534542658639e-1
n = 100 , left side = 1.54044053860310e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.45955946139690e-2
n = 200 , left side = 7.31683725369431e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.33938408649604e-2
n = 500 , left side = 2.83424719393505e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18871123560607e-2
```

x^3

```
n = 10 , left side = 1.73192000431425e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.43035765585413e-1
n = 20 , left side = 1.03864925521532e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.19741872228447e-1
n = 50 , left side = 3.05073733511566e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.10913982886153e-1
n = 100 , left side = 1.27681795752465e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.72318204247535e-2
n = 200 , left side = 5.78399942625285e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.49266786924019e-2
n = 500 , left side = 2.17239948281686e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.25489600671789e-2
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.35970411320625e-1
n = 20 , left side = 9.63498090064419e-2
```

```
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.27256988743537e-1
        n = 50 , left side = 2.41914336230854e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.17229922614224e-1
        n = 100 , left side = 9.37035404303936e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.06296459569606e-2
        n = 200 , left side = 4.05904957310239e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.66516285455524e-2
        n = 500 , left side = 1.47973714572867e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.32416224042671e-2
```

$$x^{10}$$

```
        n = 10 , left side = 1.19260700953333e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.96967065063505e-1
        n = 20 , left side = 3.73465208237526e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.86260276926226e-1
        n = 50 , left side = 2.80162956157202e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.38619726675737e-1
        n = 100 , left side = 6.32905221145905e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.93670947788541e-2
        n = 200 , left side = 2.12043953336255e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.04986341653185e-2
        n = 500 , left side = 6.54808182457849e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46558787317500e-2


-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 8.10134985303518e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.35214267486486e-1
        n = 20 , left side = 1.68560763315222e-2
                1/n^(1/2) = 2.23606797749979e-1
```

```
          difference = 2.06750721418457e-1
n = 50 , left side = 1.97802106438810e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39443335172921e-1
n = 100 , left side = 4.80026592953875e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95199734070461e-2
n = 200 , left side = 1.19239646471203e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05914384721835e-2
n = 500 , left side = 1.90449720901542e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47023145779056e-2
```

x

```
n = 10 , left side = 4.91637605442458e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.67064005472592e-1
n = 20 , left side = 3.39394250680031e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20212855243179e-1
n = 50 , left side = 1.64890433862475e-6
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41419707332971e-1
n = 100 , left side = 5.86131143620605e-12
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999941387e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 1.11022302462516e-16
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

x^2

```
n = 10 , left side = 5.25230782287648e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.63704687788073e-1
n = 20 , left side = 2.83373415030339e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.95269456246945e-1
n = 50 , left side = 5.39457664221715e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36026779595092e-1
n = 100 , left side = 1.34928057788158e-3
          1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 9.86507194221184e-2
n = 200 , left side = 3.37320146703013e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03733579719517e-2
n = 500 , left side = 5.39712234723932e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46673883265234e-2
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.34004315388468e-1
n = 20 , left side = 4.36057626242194e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.80001035125760e-1
n = 50 , left side = 8.09259320656255e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33328763030747e-1
n = 100 , left side = 2.02392086959330e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.79760791304067e-2
n = 200 , left side = 5.05980220054492e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02046978986003e-2
n = 500 , left side = 8.09568352087287e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46404027147871e-2
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.15174792723276e-1
n = 20 , left side = 4.67481413489400e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.76858656401039e-1
n = 50 , left side = 8.21282675171921e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33208529485590e-1
n = 100 , left side = 2.03145927015687e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.79685407298431e-2
n = 200 , left side = 5.06451370153274e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02042267485015e-2
n = 500 , left side = 8.09688966512401e-5
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46403906533446e-2
```

$$x^{10}$$

```
        n = 10 , left side = 7.01207124827066e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.46107053534131e-1
        n = 20 , left side = 2.01574704246336e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.03449327325345e-1
        n = 50 , left side = 1.42480124701178e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39996554990298e-1
        n = 100 , left side = 2.63178146244829e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.97368218537552e-2
        n = 200 , left side = 6.08599933530623e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06498181253017e-2
        n = 500 , left side = 9.52678517993620e-6
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47118327648159e-2


--------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 5.33369660315084e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.62890799985330e-1
        n = 20 , left side = 3.23728371506256e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.91233960599353e-1
        n = 50 , left side = 1.39366391997126e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.27484717037597e-1
        n = 100 , left side = 7.14621856758912e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.28537814324109e-2
        n = 200 , left side = 3.61961230894114e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.70910658097136e-2
        n = 500 , left side = 1.45930076253686e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32620587874589e-2
```

x

```
n = 10 , left side = 1.29071817455777e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87155948561061e-1
n = 20 , left side = 6.92514035886481e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.54355394161331e-1
n = 50 , left side = 2.77258876437845e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13695468593525e-1
n = 100 , left side = 1.38629438314651e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61370561685349e-2
n = 200 , left side = 6.93147191573262e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37792062029221e-2
n = 500 , left side = 2.77258876629316e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487707837026e-2
```

x^2

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.38836852498031e-1
n = 20 , left side = 8.30737213816239e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.40533076368355e-1
n = 50 , left side = 2.99438930027937e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11477463234516e-1
n = 100 , left side = 1.44174451738843e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.55825548261157e-2
n = 200 , left side = 7.07009725133734e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.36405808673174e-2
n = 500 , left side = 2.79476881998975e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19265907300060e-2
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.34520925999240e-1
n = 20 , left side = 7.48642399521750e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.48742557797804e-1
n = 50 , left side = 2.42632851043289e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.17158071132981e-1
n = 100 , left side = 1.12466925545659e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.87533074454341e-2
n = 200 , left side = 5.40875852362382e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.53019195950309e-2
n = 500 , left side = 2.11285351660367e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.26085060333921e-2
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.48440587947144e-1
n = 20 , left side = 6.03397370785073e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.63267060671472e-1
n = 50 , left side = 1.74893080184917e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.23932048218818e-1
n = 100 , left side = 7.79966635748700e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.22003336425130e-2
n = 200 , left side = 3.67816819644862e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.70325099222061e-2
n = 500 , left side = 1.41984974971862e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33015098002772e-2
```

x^{10}

```
n = 10 , left side = 7.68027797084296e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.39424986308408e-1
n = 20 , left side = 9.76146773173468e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.13845330018244e-1
```

```
n = 50 , left side = 1.13068528957835e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40290670947731e-1
n = 100 , left side = 3.88474877995735e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96115251220043e-2
n = 200 , left side = 1.62038602246190e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05486395164086e-2
n = 500 , left side = 5.81892063839355e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46631703436119e-2


--------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96445247579276e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96583241258910e-1
n = 20 , left side = 1.48888789279412e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.08717918822038e-1
n = 50 , left side = 6.77605354912036e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34645302688189e-1
n = 100 , left side = 3.52568356510696e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.64743164348930e-2
n = 200 , left side = 1.79801315131500e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.89126649673397e-2
n = 500 , left side = 7.27768804897111e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.39935907450987e-2
```

$$x$$

```
n = 10 , left side = 6.38935662496245e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52334199767213e-1
n = 20 , left side = 3.46235470985202e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88983250651459e-1
n = 50 , left side = 1.38629429714336e-2
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27558413265876e-1
n = 100 , left side = 6.93147149063489e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30685285093651e-2
n = 200 , left side = 3.46573574531750e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72449423733373e-2
n = 500 , left side = 1.38629429812676e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33350652518690e-2
```

x^2

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.14996570848155e-1
n = 20 , left side = 4.48623512045706e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78744446545408e-1
n = 50 , left side = 1.55044047114583e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.25916951525851e-1
n = 100 , left side = 7.34183692697749e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.26581630730225e-2
n = 200 , left side = 3.56832710440308e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.71423510142517e-2
n = 500 , left side = 1.40270891558070e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33186506344151e-2
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.07176585875148e-1
n = 20 , left side = 4.22970110547812e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.81309786695198e-1
n = 50 , left side = 1.29223379237351e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28499018313574e-1
n = 100 , left side = 5.82201903348836e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.41779809665116e-2
n = 200 , left side = 2.75417225524133e-3
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.79565058634134e-2
n = 500 , left side = 1.06440558786375e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.36569539621320e-2
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.13686881335438e-1
n = 20 , left side = 3.49981874860215e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88608610263957e-1
n = 50 , left side = 9.52960631552967e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31891749921780e-1
n = 100 , left side = 4.09764755001943e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.59023524499806e-2
n = 200 , left side = 1.88876104704877e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.88219170716060e-2
n = 500 , left side = 7.17895958025142e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40034635919707e-2
```

x^{10}

```
n = 10 , left side = 4.39432749437960e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.72284491073042e-1
n = 20 , left side = 5.59881198565943e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.18007985764320e-1
n = 50 , left side = 6.58122885628528e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40763233351681e-1
n = 100 , left side = 2.17135216419734e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97828647835803e-2
n = 200 , left side = 8.67799400495889e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06238981786052e-2
n = 500 , left side = 3.00238003034161e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46913357496924e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245116e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.97369430192326e-1
n = 20 , left side = 3.43036193768773e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20176435812291e-1
n = 50 , left side = 5.15745217625319e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40905611019684e-1
n = 100 , left side = 1.28085535783029e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719144642170e-2
n = 200 , left side = 3.19697272260777e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06787083914287e-2
n = 500 , left side = 5.11285838644682e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162466916093e-2
```

$$x$$

```
n = 10 , left side = 3.03097878388942e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.13196787232949e-1
n = 20 , left side = 1.79813965207609e-5
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23588816353458e-1
n = 50 , left side = 5.04990493865876e-12
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356232260e-1
n = 100 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

x^2

```
n = 10 , left side = 3.13288100022529e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.84898956014585e-1
n = 20 , left side = 9.02981956494570e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.14576978185033e-1
n = 50 , left side = 1.44928066358063e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39972075573729e-1
n = 100 , left side = 3.62320167826224e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96376798321738e-2
n = 200 , left side = 9.05800419565006e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06200980766983e-2
n = 500 , left side = 1.44928067130623e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47068667432827e-2
```

x^3

```
n = 10 , left side = 4.78600213916088e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.68367744625229e-1
n = 20 , left side = 1.35520533206199e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.10054744429359e-1
n = 50 , left side = 2.17392099772562e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39247435239584e-1
n = 100 , left side = 5.43480251739253e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94565197482608e-2
n = 200 , left side = 1.35870062934917e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05748080557198e-2
n = 500 , left side = 2.17392100695379e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46996203399263e-2
```

x^4

```
n = 10 , left side = 5.14533906505906e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.64774375366247e-1
n = 20 , left side = 1.38732244570933e-2
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.09733573292886e-1
n = 50 , left side = 2.18227896612348e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39239077271186e-1
n = 100 , left side = 5.44002624822709e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94559973751773e-2
n = 200 , left side = 1.35902711252578e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05747754074022e-2
n = 500 , left side = 2.17400458664557e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46996195041293e-2
```

$$x^{10}$$

```
n = 10 , left side = 2.39574413183784e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.92270324698460e-1
n = 20 , left side = 2.97086004062662e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20635937709352e-1
n = 50 , left side = 2.83599622557859e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41137756614752e-1
n = 100 , left side = 6.54249762594714e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99345750237405e-2
n = 200 , left side = 1.60297404174898e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06946483782373e-2
n = 500 , left side = 2.55030753054338e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47188092424652e-2


-------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 7.33574282376018e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.26168803259286e-1
n = 20 , left side = 4.53841801182795e-2
          1/n^(7/10) = 1.22822802611579e-1
```

```
          difference = 7.74386224932996e-2
n = 50 , left side = 4.74957712877522e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.71769293699835e-2
n = 100 , left side = 2.67013950556250e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.31093219997248e-2
n = 200 , left side = 1.39773905392248e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.05289804077497e-2
n = 500 , left side = 5.75326859927561e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.15063164368872e-3
```

x

```
n = 10 , left side = 1.48505389324611e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.84675692564427e-1
n = 20 , left side = 1.39174879467005e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.63520768554256e-2
n = 50 , left side = 1.07608816899146e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -4.29361162414101e-2
n = 100 , left side = 5.54452812788875e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -1.56345642235377e-2
n = 200 , left side = 2.77258871979469e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -3.21951625097238e-3
n = 500 , left side = 1.10903548889590e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.81354535400528e-3
```

x^2

```
n = 10 , left side = 1.94005188391137e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.52104310575061e-3
n = 20 , left side = 2.30868040947246e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.08045238335667e-1
n = 50 , left side = 1.38886956653740e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -7.42142559960043e-2
n = 100 , left side = 6.38134518553902e-2
          1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = -2.40027348000404e-2
n = 200 , left side = 2.98188925936176e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -5.31252164664308e-3
n = 500 , left side = 1.14252357544120e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.47866448855231e-3
```

x^3

```
n = 10 , left side = 2.06175421900514e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -6.64919040362641e-3
n = 20 , left side = 2.53575282932135e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.30752480320556e-1
n = 50 , left side = 1.34595194359457e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -6.99224937017210e-2
n = 100 , left side = 5.51857590364190e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -1.53750419810693e-2
n = 200 , left side = 2.40653876252186e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 4.40983321755854e-4
n = 500 , left side = 8.82850116987993e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 4.07539907308439e-3
```

x^4

```
n = 10 , left side = 2.45980444406422e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.64542129095339e-2
n = 20 , left side = 2.51901006172595e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.29078203561016e-1
n = 50 , left side = 1.17335729825916e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -5.26630291681798e-2
n = 100 , left side = 4.25973806719297e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -2.78666361658000e-3
n = 200 , left side = 1.72794180717636e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 7.22695287521092e-3
n = 500 , left side = 6.06468552840350e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 6.83921471456082e-3
```

$$x^{10}$$

```
        n = 10 , left side = 1.88296929722229e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.12293017746591e-2
        n = 20 , left side = 1.57124987034018e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = -3.43021844224392e-2
        n = 50 , left side = 3.56919049916328e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 2.89807956661030e-2
        n = 100 , left side = 4.80555765395135e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.50051594013984e-2
        n = 200 , left side = 1.09199033498755e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.34143806119869e-2
        n = 500 , left side = 2.84658201772788e-4
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.26192420411915e-2


--------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.26504552641874e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 7.30216788550139e-2
        n = 20 , left side = 2.03548587742321e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.02467943837347e-1
        n = 50 , left side = 2.03304570248789e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.43422436328568e-2
        n = 100 , left side = 1.26409079150101e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.71698091403397e-2
        n = 200 , left side = 6.81868079261327e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.76876901543612e-2
        n = 500 , left side = 2.84988268112440e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.00540175618399e-2
```

x

```
n = 10 , left side = 8.02267409115547e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.19299490585333e-1
n = 20 , left side = 5.14929405767164e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.13298620348627e-2
n = 50 , left side = 5.36143926388593e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.10583080188765e-2
n = 100 , left side = 2.77224568458395e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.20882602095102e-2
n = 200 , left side = 1.38629435986317e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06434273483428e-2
n = 500 , left side = 5.54517744447958e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35872279848475e-3
```

x^2

```
n = 10 , left side = 1.28296366461717e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.12298650351711e-2
n = 20 , left side = 1.38397942935223e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.55751403236439e-2
n = 50 , left side = 7.67416652503928e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.20689645926570e-2
n = 100 , left side = 3.37863631986789e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 6.02435385667079e-3
n = 200 , left side = 1.53794053842904e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 9.12696556268411e-3
n = 500 , left side = 5.78781133126016e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.11608891170416e-3
```

x^3

```
n = 10 , left side = 1.27831704419723e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.16945270771650e-2
n = 20 , left side = 1.61344011208260e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.85212085966809e-2
n = 50 , left side = 7.78602100423141e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -1.31875093845783e-2
n = 100 , left side = 3.03485286276982e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.46218842765152e-3
n = 200 , left side = 1.27296398524400e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.17767310945345e-2
n = 500 , left side = 4.52652924015573e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.37737100280859e-3
```

x^4

```
n = 10 , left side = 1.84494512877635e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.50317186192533e-2
n = 20 , left side = 1.66506805511951e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -4.36840029003719e-2
n = 50 , left side = 6.92290642748952e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -4.55636361715941e-3
n = 100 , left side = 2.40205845419830e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.57901325133667e-2
n = 200 , left side = 9.33054650504626e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.51758244419282e-2
n = 500 , left side = 3.14415812448718e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.75974211847714e-3
```

x^{10}

```
n = 10 , left side = 1.40771586828727e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.87546446681610e-2
n = 20 , left side = 1.00214745282116e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.26080573294635e-2
```

```
n = 50 , left side = 1.99853845577976e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.46873160999382e-2
n = 100 , left side = 2.75646208624232e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.70542549691074e-2
n = 200 , left side = 6.26624240120737e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.38797467068538e-2
n = 500 , left side = 1.55217235579003e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27486830073853e-2


--------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 2.09749541545875e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -1.02233100489871e-2
n = 20 , left side = 7.85812770396357e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.42415255719434e-2
n = 50 , left side = 9.34393044496793e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.53287702127678e-2
n = 100 , left side = 1.94070471300632e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.78700123423434e-2
n = 200 , left side = 4.71100029514449e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40352709174601e-2
n = 500 , left side = 7.48422627478984e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28290579802164e-2
```

$$x$$

```
n = 10 , left side = 2.08951638220122e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -9.42540672323403e-3
n = 20 , left side = 5.25889244914823e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.02338781200968e-2
n = 50 , left side = 1.01379455384015e-3
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.36589061038956e-2
n = 100 , left side = 1.80708522862227e-6
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98089099701211e-2
n = 200 , left side = 6.45494768747312e-12
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709405196e-2
n = 500 , left side = 1.11022302462516e-16
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429642e-2
```

x^2

```
n = 10 , left side = 6.09251809834973e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.38601050513391e-1
n = 20 , left side = 4.57428235934710e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.70799790181080e-2
n = 50 , left side = 1.96014797649489e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.50712208927869e-2
n = 100 , left side = 5.29434230595238e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.45163747493974e-2
n = 200 , left side = 1.32428057699485e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.31820903699797e-2
n = 500 , left side = 2.11884893889736e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.26920153490746e-2
```

x^3

```
n = 10 , left side = 3.81659578000773e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.61360273696811e-1
n = 20 , left side = 7.43081431790645e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.85146594325146e-2
n = 50 , left side = 2.97879650699726e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.48847355877632e-2
n = 100 , left side = 7.94232255998331e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.18683944953664e-2
n = 200 , left side = 1.98642086856271e-3
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.25199500784118e-2
n = 500 , left side = 3.17827340834881e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25860729021294e-2
```

x^4

```
n = 10 , left side = 1.25757444757586e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.37687867393016e-2
n = 20 , left side = 9.19703672747022e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.08524353368769e-2
n = 50 , left side = 3.13124123712135e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.33602882865223e-2
n = 100 , left side = 8.05935138518928e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.17513656701605e-2
n = 200 , left side = 1.99376000196876e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.25126109450057e-2
n = 500 , left side = 3.18015222677673e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25858850202867e-2
```

x^{10}

```
n = 10 , left side = 9.92211518367572e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.00305079660131e-1
n = 20 , left side = 5.87860822296066e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.40367203819724e-2
n = 50 , left side = 1.06402237950818e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.40324768626540e-2
n = 100 , left side = 1.39397823915502e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.84167388161947e-2
n = 200 , left side = 2.58092754852007e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42482781921225e-2
n = 500 , left side = 3.78668260720162e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28660334168923e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.65939350634127e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.52932296433475e-1
n = 20 , left side = 5.39175273339060e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.89052752776731e-2
n = 50 , left side = 2.66706958509519e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.80020048067839e-2
n = 100 , left side = 1.39692422376499e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.58414748176998e-2
n = 200 , left side = 7.15466879542803e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.73517021515465e-2
n = 500 , left side = 2.90466167844949e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.99923856451483e-3
```

$$x$$

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.25656899880095e-2
n = 20 , left side = 1.28044818944893e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.22201633331368e-3
n = 50 , left side = 5.54458428059438e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.22685785179198e-3
n = 100 , left side = 2.77258872001896e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.20848298551601e-2
n = 200 , left side = 1.38629436111991e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06434273357754e-2
n = 500 , left side = 5.54517744447969e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35872279848464e-3
```

x^2

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.45427257182056e-2
n = 20 , left side = 1.73393496362237e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.05706937506579e-2
n = 50 , left side = 6.39143140576404e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 7.58386600095390e-4
n = 100 , left side = 2.98438925970290e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.96682445832077e-3
n = 200 , left side = 1.43924449634691e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.01139259835054e-2
n = 500 , left side = 5.62989766084271e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.27400258212161e-3
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.10058499900678e-2
n = 20 , left side = 1.75303858260733e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.24810556491538e-2
n = 50 , left side = 5.53534166881953e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.31928396954043e-3
n = 100 , left side = 2.41049670707778e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.57057499845719e-2
n = 200 , left side = 1.12081526845384e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.32982182624361e-2
n = 500 , left side = 4.28703175655956e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.61686848640476e-3
```

x^4

```
n = 10 , left side = 2.71811655321144e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.22854238242564e-2
n = 20 , left side = 1.59700780897926e-1
```

```
                1/n^(7/10) = 1.22822802611579e-1
                difference = -3.68779782863465e-2
        n = 50 , left side = 4.27867893894553e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 2.18859112682805e-2
        n = 100 , left side = 1.73213915349857e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.24893255203640e-2
        n = 200 , left side = 7.76000677274198e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 1.67463641742325e-2
        n = 500 , left side = 2.90182870840228e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.00020715345620e-2
```

$$x^{10}$$

```
        n = 10 , left side = 1.86850823331552e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.26754081653363e-2
        n = 20 , left side = 6.58347789205074e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 5.69880236910716e-2
        n = 50 , left side = 4.87085072187453e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.98018499358612e-2
        n = 100 , left side = 1.09970741431004e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.87110096410397e-2
        n = 200 , left side = 3.82804893814671e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.41235660531598e-2
        n = 500 , left side = 1.24276968148370e-4
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.27796232748160e-2


-------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.96080052578451e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.79918226239043e-1
        n = 20 , left side = 2.08299179386357e-2
                1/n^(7/10) = 1.22822802611579e-1
```

```
          difference = 1.01992884672943e-1
n = 50 , left side = 1.26071386109584e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.20655620467774e-2
n = 100 , left side = 6.81015763376203e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.30005594215877e-2
n = 200 , left side = 3.53432821873112e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.09720427282434e-2
n = 500 , left side = 1.44549650366466e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14584037392997e-2
```

x

```
n = 10 , left side = 5.68097172543791e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.42716514242509e-1
n = 20 , left side = 6.32752819000136e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.95475207115654e-2
n = 50 , left side = 2.77227554082916e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69499452494441e-2
n = 100 , left side = 1.38629435997857e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59477734555641e-2
n = 200 , left side = 6.93147180559928e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75748991413752e-2
n = 500 , left side = 2.77258872223984e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313115207245e-2
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.16534790860097e-2
n = 20 , left side = 9.78605569036921e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.49622457078869e-2
n = 50 , left side = 3.38868135786705e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.07858870790653e-2
n = 100 , left side = 1.54044053860310e-2
          1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 2.44063116693187e-2
n = 200 , left side = 7.31683725369431e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.71895336932802e-2
n = 500 , left side = 2.83424719393505e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.00696530490293e-2
```

x^3

```
n = 10 , left side = 1.73192000431425e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.63342310654626e-2
n = 20 , left side = 1.03864925521532e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.89578770900472e-2
n = 50 , left side = 3.05073733511566e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.41653273065791e-2
n = 100 , left side = 1.27681795752465e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.70425374801032e-2
n = 200 , left side = 5.78399942625285e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.87223715207217e-2
n = 500 , left side = 2.17239948281686e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07315007601475e-2
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.92688768006752e-2
n = 20 , left side = 9.63498090064419e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.64729936051371e-2
n = 50 , left side = 2.41914336230854e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.04812670346503e-2
n = 100 , left side = 9.37035404303936e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.04403630123104e-2
n = 200 , left side = 4.05904957310239e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.04473213738721e-2
n = 500 , left side = 1.47973714572867e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.14241630972356e-2
```

$$x^{10}$$

```
        n = 10 , left side = 1.19260700953333e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 8.02655305435547e-2
        n = 20 , left side = 3.73465208237526e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 8.54762817878265e-2
        n = 50 , left side = 2.80162956157202e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.18710710961637e-2
        n = 100 , left side = 6.32905221145905e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.91778118342038e-2
        n = 200 , left side = 2.12043953336255e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.42943269936382e-2
        n = 500 , left side = 6.54808182457849e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28384194247185e-2


--------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 8.10134985303518e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.18512732966536e-1
        n = 20 , left side = 1.68560763315222e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.05966726280057e-1
        n = 50 , left side = 1.97802106438810e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.26946795933477e-2
        n = 100 , left side = 4.80026592953875e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.93306904623959e-2
        n = 200 , left side = 1.19239646471203e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43871313005033e-2
        n = 500 , left side = 1.90449720901542e-5
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848552708742e-2
```

x

```
n = 10 , left side = 4.91637605442458e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.50362470952642e-1
n = 20 , left side = 3.39394250680031e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19428860104779e-1
n = 50 , left side = 1.64890433862475e-6
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46710517533971e-2
n = 100 , left side = 5.86131143620605e-12
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170494884e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 1.11022302462516e-16
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429642e-2
```

x^2

```
n = 10 , left side = 5.25230782287648e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.47003153268123e-1
n = 20 , left side = 2.83373415030339e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.44854611085452e-2
n = 50 , left side = 5.39457664221715e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.92781240155186e-2
n = 100 , left side = 1.34928057788158e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.84614364774681e-2
n = 200 , left side = 3.37320146703013e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41690508002715e-2
n = 500 , left side = 5.39712234723932e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28499290194919e-2
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.17302780868518e-1
n = 20 , left side = 4.36057626242194e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.92170399873597e-2
n = 50 , left side = 8.09259320656255e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.65801074511732e-2
n = 100 , left side = 2.02392086959330e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.77867961857564e-2
n = 200 , left side = 5.05980220054492e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40003907269200e-2
n = 500 , left side = 8.09568352087287e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28229434077556e-2
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.84732582033262e-2
n = 20 , left side = 4.67481413489400e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.60746612626391e-2
n = 50 , left side = 8.21282675171921e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.64598739060165e-2
n = 100 , left side = 2.03145927015687e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.77792577851929e-2
n = 200 , left side = 5.06451370153274e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39999195768212e-2
n = 500 , left side = 8.09688966512401e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28229313463131e-2
```

x^{10}

```
n = 10 , left side = 7.01207124827066e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.29405519014181e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02665332186945e-1
```

```
n = 50 , left side = 1.42480124701178e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.32478994107240e-2
n = 100 , left side = 2.63178146244829e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95475389091049e-2
n = 200 , left side = 6.08599933530623e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44455109536214e-2
n = 500 , left side = 9.52678517993620e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28943734577844e-2


-------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.33369660315084e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.46189265465380e-1
n = 20 , left side = 3.23728371506256e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.04499654609535e-2
n = 50 , left side = 1.39366391997126e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.07360614580232e-2
n = 100 , left side = 7.14621856758912e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.26644984877606e-2
n = 200 , left side = 3.61961230894114e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.08867586380334e-2
n = 500 , left side = 1.45930076253686e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14445994804275e-2
```

$$x$$

```
n = 10 , left side = 1.29071817455777e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.04544140411110e-2
n = 20 , left side = 6.92514035886481e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.35713990229309e-2
n = 50 , left side = 2.77258876437845e-2
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69468130139513e-2
n = 100 , left side = 1.38629438314651e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59477732238846e-2
n = 200 , left side = 6.93147191573262e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75748990312419e-2
n = 500 , left side = 2.77258876629316e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313114766712e-2
```

x^2

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.21353179780806e-2
n = 20 , left side = 8.30737213816239e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.97490812299551e-2
n = 50 , left side = 2.99438930027937e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.47288076549420e-2
n = 100 , left side = 1.44174451738843e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.53932718814654e-2
n = 200 , left side = 7.07009725133734e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.74362736956372e-2
n = 500 , left side = 2.79476881998975e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01091314229746e-2
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.78193914792900e-2
n = 20 , left side = 7.48642399521750e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.79585626594041e-2
n = 50 , left side = 2.42632851043289e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.04094155534069e-2
n = 100 , left side = 1.12466925545659e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.85640245007838e-2
n = 200 , left side = 5.40875852362382e-3
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.90976124233507e-2
n = 500 , left side = 2.11285351660367e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07910467263606e-2
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 3.17390534271941e-2
n = 20 , left side = 6.03397370785073e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.24830655330717e-2
n = 50 , left side = 1.74893080184917e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.71833926392440e-2
n = 100 , left side = 7.79966635748700e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.20110506978627e-2
n = 200 , left side = 3.67816819644862e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.08282027505259e-2
n = 500 , left side = 1.41984974971862e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14840504932457e-2
```

x^{10}

```
n = 10 , left side = 7.68027797084296e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.22723451788458e-1
n = 20 , left side = 9.76146773173468e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.13061334879844e-1
n = 50 , left side = 1.13068528957835e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.35420153681574e-2
n = 100 , left side = 3.88474877995735e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94222421773540e-2
n = 200 , left side = 1.62038602246190e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43443323447283e-2
n = 500 , left side = 5.81892063839355e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28457110365804e-2
```

```
--------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96445247579276e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79881706738960e-1
n = 20 , left side = 1.48888789279412e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.07933923683638e-1
n = 50 , left side = 6.77605354912036e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.78966471086154e-2
n = 100 , left side = 3.52568356510696e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.62850334902428e-2
n = 200 , left side = 1.79801315131500e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27083577956595e-2
n = 500 , left side = 7.27768804897111e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.21761314380672e-2
```

$$x$$

```
n = 10 , left side = 6.38935662496245e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.35632665247264e-1
n = 20 , left side = 3.46235470985202e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.81992555130588e-2
n = 50 , left side = 1.38629429714336e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.08097576863021e-2
n = 100 , left side = 6.93147149063489e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.28792455647148e-2
n = 200 , left side = 3.46573574531750e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10406352016570e-2
n = 500 , left side = 1.38629429812676e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15176059448376e-2
```

x^2

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.82950363282051e-2
n = 20 , left side = 4.48623512045706e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.79604514070084e-2
n = 50 , left side = 1.55044047114583e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.91682959462775e-2
n = 100 , left side = 7.34183692697749e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.24688801283722e-2
n = 200 , left side = 3.56832710440308e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.09380438425714e-2
n = 500 , left side = 1.40270891558070e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15011913273836e-2
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.04750513551980e-2
n = 20 , left side = 4.22970110547812e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.05257915567978e-2
n = 50 , left side = 1.29223379237351e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.17503627340007e-2
n = 100 , left side = 5.82201903348836e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.39886980218614e-2
n = 200 , left side = 2.75417225524133e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.17521986917332e-2
n = 500 , left side = 1.06440558786375e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.18394946551006e-2
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.69853468154883e-2
n = 20 , left side = 3.49981874860215e-2
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.78246151255575e-2
n = 50 , left side = 9.52960631552967e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.51430943422061e-2
n = 100 , left side = 4.09764755001943e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.57130695053303e-2
n = 200 , left side = 1.88876104704877e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.26176098999257e-2
n = 500 , left side = 7.17895958025142e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.21860042849392e-2
```

$$x^{10}$$

```
n = 10 , left side = 4.39432749437960e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.55582956553092e-1
n = 20 , left side = 5.59881198565943e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17223990625920e-1
n = 50 , left side = 6.58122885628528e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.40145777721072e-2
n = 100 , left side = 2.17135216419734e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95935818389300e-2
n = 200 , left side = 8.67799400495889e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44195910069249e-2
n = 500 , left side = 3.00238003034161e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28738764426609e-2


-------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245116e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.80667895672376e-1
n = 20 , left side = 3.43036193768773e-3
          1/n^(7/10) = 1.22822802611579e-1
```

```
          difference = 1.19392440673891e-1
n = 50 , left side = 5.15745217625319e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41569554401104e-2
n = 100 , left side = 1.28085535783029e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826315195667e-2
n = 200 , left side = 3.19697272260777e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44744012197484e-2
n = 500 , left side = 5.11285838644682e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987873845779e-2
```

x

```
n = 10 , left side = 3.03097878388942e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.96495252712999e-1
n = 20 , left side = 1.79813965207609e-5
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22804821215058e-1
n = 50 , left side = 5.04990493865876e-12
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006526858e-2
n = 100 , left side = 0.000000000000000e0
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553497e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 3.13288100022529e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.68197421494635e-1
n = 20 , left side = 9.02981956494570e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.13792983046633e-1
n = 50 , left side = 1.44928066358063e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.32234199941551e-2
n = 100 , left side = 3.62320167826224e-4
          1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 3.94483968875235e-2
n = 200 , left side = 9.05800419565006e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44157909050180e-2
n = 500 , left side = 1.44928067130623e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28894074362513e-2
```

x^3

```
n = 10 , left side = 4.78600213916088e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.51666210105279e-1
n = 20 , left side = 1.35520533206199e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.09270749290959e-1
n = 50 , left side = 2.17392099772562e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24987796600101e-2
n = 100 , left side = 5.43480251739253e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92672368036105e-2
n = 200 , left side = 1.35870062934917e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43705008840396e-2
n = 500 , left side = 2.17392100695379e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28821610328948e-2
```

x^4

```
n = 10 , left side = 5.14533906505906e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.48072840846297e-1
n = 20 , left side = 1.38732244570933e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.08949578154486e-1
n = 50 , left side = 2.18227896612348e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24904216916123e-2
n = 100 , left side = 5.44002624822709e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92667144305270e-2
n = 200 , left side = 1.35902711252578e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43704682357219e-2
n = 500 , left side = 2.17400458664557e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28821601970979e-2
```

$$x^{10}$$

```
        n = 10 , left side = 2.39574413183784e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.75568790178510e-1
        n = 20 , left side = 2.97086004062662e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.19851942570952e-1
        n = 50 , left side = 2.83599622557859e-4
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.43891010351779e-2
        n = 100 , left side = 6.54249762594714e-5
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.97452920790903e-2
        n = 200 , left side = 1.60297404174898e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44903412065570e-2
        n = 500 , left side = 2.55030753054338e-6
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.29013499354338e-2


-------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 5.75537791341353e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.43633454493137e-1
        n = 20 , left side = 5.01538635844617e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.56936667952443e-1
        n = 50 , left side = 4.44369247935306e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.64812569917461e-1
        n = 100 , left side = 2.45022894564701e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.26686353694488e-1
        n = 200 , left side = 1.27759995447253e-2
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.91252577792112e-1
        n = 500 , left side = 5.24594907413400e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49745949680700e-1
```

x

```
n = 10 , left side = 4.11343756864777e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.60052857940795e-1
n = 20 , left side = 1.45618700583181e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.61471830953723e-1
n = 50 , left side = 9.91789471280212e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.10070547582971e-1
n = 100 , left side = 5.04725022113053e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.00716140939653e-1
n = 200 , left side = 2.52371901407978e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.78791387196039e-1
n = 500 , left side = 1.00948760571513e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.44897022697682e-1
```

x^2

```
n = 10 , left side = 2.04066900796696e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.97120332830577e-1
n = 20 , left side = 2.30763289774789e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.76327241762116e-1
n = 50 , left side = 1.25781802608068e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.83467692102924e-1
n = 100 , left side = 5.74136341424519e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 1.93775009008506e-1
n = 200 , left side = 2.69727481887477e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.77055829148089e-1
n = 500 , left side = 1.03725653449941e-2
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.44619333409840e-1
```

x^3

```
n = 10 , left side = 2.22265806381169e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.78921427246104e-1
n = 20 , left side = 2.51457751362967e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.55632780173937e-1
n = 50 , left side = 1.19898883779918e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 1.89350610931074e-1
n = 100 , left side = 4.90594926169464e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.02129150534012e-1
n = 200 , left side = 2.16304835738007e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.82398093763036e-1
n = 500 , left side = 7.99404322403299e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.46997855530801e-1
```

x^4

```
n = 10 , left side = 2.53907045566462e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.47280188060811e-1
n = 20 , left side = 2.47162291851446e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 1.59928239685458e-1
n = 50 , left side = 1.02722340452672e-1
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.06527154258320e-1
n = 100 , left side = 3.73888726022915e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.13799770548667e-1
n = 200 , left side = 1.54300915414019e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.88598485795435e-1
n = 500 , left side = 5.47692354028259e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49514975214551e-1
```

x^{10}

```
n = 10 , left side = 1.92937097609011e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.08250136018261e-1
n = 20 , left side = 1.49559668336496e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.57530863200408e-1
```

```
n = 50 , left side = 2.75696561028719e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81679838608120e-1
n = 100 , left side = 3.77940987916722e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47409233271791e-1
n = 200 , left side = 9.30819259943895e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03097758076893e-1
n = 500 , left side = 2.52816609553913e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54739082145280e-1


-------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.07961176896914e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.93226056730358e-1
n = 20 , left side = 1.46187478380900e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.92471783698814e-1
n = 50 , left side = 1.94917100471842e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.89757784663808e-1
n = 100 , left side = 1.16676593427210e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.39520983808237e-1
n = 200 , left side = 6.24728154686105e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97781295789976e-1
n = 500 , left side = 2.60078820414289e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52391110550691e-1
```

$$x$$

```
n = 10 , left side = 5.43674197616052e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.46819813865667e-1
n = 20 , left side = 5.97131060056814e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.47377425531223e-1
n = 50 , left side = 4.94969863858885e-2
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.59752508325103e-1
n = 100 , left side = 2.52362028556755e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.25952440295282e-1
n = 200 , left side = 1.26185950703714e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.91409982266466e-1
n = 500 , left side = 5.04743802855501e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49944460726279e-1
```

x^2

```
n = 10 , left side = 1.32556015739249e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.68631217888024e-1
n = 20 , left side = 1.37272215541269e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.69818315995636e-1
n = 50 , left side = 6.90260023884016e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.40223492322590e-1
n = 100 , left side = 3.02671339674381e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.20921509183520e-1
n = 200 , left side = 1.38764662941516e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90152111042685e-1
n = 500 , left side = 5.24869742446599e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49743201330368e-1
```

x^3

```
n = 10 , left side = 1.40543119011788e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.60644114615484e-1
n = 20 , left side = 1.58712613139094e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.48377918397810e-1
n = 50 , left side = 6.88292839445783e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.40420210766413e-1
n = 100 , left side = 2.68220350961968e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.24366608054761e-1
n = 200 , left side = 1.13943523499742e-2
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.92634224986863e-1
n = 500 , left side = 4.09025796482596e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50901640790008e-1
```

x^4

```
n = 10 , left side = 1.86776861573453e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.14410372053819e-1
n = 20 , left side = 1.60981190569593e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.46109340967311e-1
n = 50 , left side = 6.02023592387208e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.49047135472271e-1
n = 100 , left side = 2.09592607620394e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.30229382388919e-1
n = 200 , left side = 8.28942525108543e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.95739152085752e-1
n = 500 , left side = 2.83134554214828e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52160553212685e-1
```

x^{10}

```
n = 10 , left side = 1.41044486023075e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.60142747604198e-1
n = 20 , left side = 9.34299576253183e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.13660573911586e-1
n = 50 , left side = 1.54202118287511e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.93829282882241e-1
n = 100 , left side = 2.17644194948917e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49012201201469e-1
n = 200 , left side = 5.32154058320025e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03496423278517e-1
n = 500 , left side = 1.37121741177569e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54854777013656e-1
```

```
-------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.90388797997796e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.10798435629477e-1
n = 20 , left side = 6.56235719263559e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.41466959610549e-1
n = 50 , left side = 7.42709237196895e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01822402339023e-1
n = 100 , left side = 1.59797012007034e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49590673030888e-1
n = 200 , left side = 3.90256075863404e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03638321260974e-1
n = 500 , left side = 6.20761738443498e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54929822580989e-1
```

$$x$$

```
n = 10 , left side = 1.82048832905811e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.19138400721461e-1
n = 20 , left side = 3.98117744785634e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.67278757058341e-1
n = 50 , left side = 5.34964466007426e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08714530244984e-1
n = 100 , left side = 5.17768589392009e-7
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188125382369e-1
n = 200 , left side = 5.39956968026445e-13
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336297e-1
n = 500 , left side = 3.38618022510673e-15
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754830e-1
```

x^2

```
n = 10 , left side = 5.88172688754145e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.42369964751858e-1
n = 20 , left side = 4.49462410450516e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62144290491853e-1
n = 50 , left side = 1.67425450005100e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.92506949710482e-1
n = 100 , left side = 4.39377386083023e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46794869290128e-1
n = 200 , left side = 1.09864228194106e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02929935054896e-1
n = 500 , left side = 1.75782765241383e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54816115989592e-1
```

x^3

```
n = 10 , left side = 4.95124186505144e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.51674814976758e-1
n = 20 , left side = 7.32951186472261e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.33795412889678e-1
n = 50 , left side = 2.53238530046482e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.83925641706344e-1
n = 100 , left side = 6.59089508039287e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44597748070565e-1
n = 200 , left side = 1.64796342317008e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02380613913667e-1
n = 500 , left side = 2.63674147862936e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54728224606971e-1
```

x^4

```
n = 10 , left side = 1.22860489069735e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.78326744557537e-1
n = 20 , left side = 8.73610920723158e-2
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.19729439464589e-1
n = 50 , left side = 2.64418118614758e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.82807682849516e-1
n = 100 , left side = 6.67154569006664e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44517097460891e-1
n = 200 , left side = 1.65301091267021e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02375566424167e-1
n = 500 , left side = 2.63803363596202e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54728095391237e-1
```

$$x^{10}$$

```
n = 10 , left side = 9.63190321145369e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.04868201512735e-1
n = 20 , left side = 5.39093328633610e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.53181198673543e-1
n = 50 , left side = 8.17939164535952e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01070103065632e-1
n = 100 , left side = 1.08271876334556e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50105924387612e-1
n = 200 , left side = 2.10380112720596e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03818197224116e-1
n = 500 , left side = 3.13261214726040e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54960572633361e-1


-------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.10916196819691e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.50095613945303e-1
n = 20 , left side = 5.13943806064787e-2
          1/n^(3/10) = 4.07090531536904e-1
```

```
          difference = 3.55696150930426e-1
n = 50 , left side = 2.44712193497084e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.84778275361283e-1
n = 100 , left side = 1.27678015370490e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38420841613909e-1
n = 200 , left side = 6.52631215849020e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97502265178347e-1
n = 500 , left side = 2.64623666471886e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52345662090115e-1
```

x

```
n = 10 , left side = 1.52194639517326e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.48992594109946e-1
n = 20 , left side = 1.19795287408221e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.87295244128683e-1
n = 50 , left side = 5.04726774830794e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.58776817227912e-1
n = 100 , left side = 2.52371901410023e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.25951453009956e-1
n = 200 , left side = 1.26185950714269e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.91409982265410e-1
n = 500 , left side = 5.04743802857466e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49944460726259e-1
```

x^2

```
n = 10 , left side = 2.42445014784458e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.58742218842815e-1
n = 20 , left side = 1.59306359409795e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.47784172127109e-1
n = 50 , left side = 5.75139027256352e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.51735591985356e-1
n = 100 , left side = 2.69977481890565e-2
          1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.24190894961902e-1
n = 200 , left side = 1.30587345836964e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90969842753141e-1
n = 500 , left side = 5.11786035053458e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49874038404299e-1
```

x^3

```
n = 10 , left side = 2.66755167489386e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.34432066137886e-1
n = 20 , left side = 1.58629980626335e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.48460550910569e-1
n = 50 , left side = 4.92249527212995e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.60024541989692e-1
n = 100 , left side = 2.16698763634239e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.29518766787534e-1
n = 200 , left side = 1.01367989077389e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.93891778429098e-1
n = 500 , left side = 3.89202117786197e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51099877576972e-1
```

x^4

```
n = 10 , left side = 2.65292194687112e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.35895038940161e-1
n = 20 , left side = 1.42271429061233e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.64819102475671e-1
n = 50 , left side = 3.75736754012363e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.71675819309755e-1
n = 100 , left side = 1.54716380790208e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.35717005071937e-1
n = 200 , left side = 6.99541301099366e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97033164325843e-1
n = 500 , left side = 2.63098670431283e-3
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.52360912050521e-1
```

$$x^{10}$$

```
        n = 10 , left side = 1.76981933661658e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.24205299965614e-1
        n = 20 , left side = 5.30759628976999e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.54014568639204e-1
        n = 50 , left side = 3.83563208999783e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.05413862620994e-1
        n = 100 , left side = 9.38095725961607e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50250547424996e-1
        n = 200 , left side = 3.37944406623273e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03690632930214e-1
        n = 500 , left side = 1.11774573310479e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54880124181523e-1


--------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.37606830853123e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.87426550541960e-1
        n = 20 , left side = 2.07942408318349e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.86296290705070e-1
        n = 50 , left side = 1.16338810728552e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.97615613638137e-1
        n = 100 , left side = 6.23874050740880e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.44949902643549e-1
        n = 200 , left side = 3.22731032813994e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.00801267008697e-1
        n = 500 , left side = 1.31741761047521e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53674481144358e-1
```

x

```
n = 10 , left side = 6.41256145303283e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37061619096944e-1
n = 20 , left side = 5.94887988577303e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.47601732679174e-1
n = 50 , left side = 2.52362954947459e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.84013199216246e-1
n = 100 , left side = 1.26185950704787e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38570048080479e-1
n = 200 , left side = 6.30929753571374e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97719279801123e-1
n = 500 , left side = 2.52371901428061e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52468179740553e-1
```

x^2

```
n = 10 , left side = 1.45653364930992e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.55533868696280e-1
n = 20 , left side = 8.92331669463914e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.17857364590513e-1
n = 50 , left side = 3.03672736409643e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.78882221070027e-1
n = 100 , left side = 1.39014662943086e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37287176856649e-1
n = 200 , left side = 6.63001534179952e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97398561995037e-1
n = 500 , left side = 2.57503386325902e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52416864891575e-1
```

x^3

```
n = 10 , left side = 1.69427755592478e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.31759478034794e-1
n = 20 , left side = 9.31942672923572e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.13896264244547e-1
n = 50 , left side = 2.69797695441467e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.82269725166845e-1
n = 100 , left side = 1.14327987447878e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.39755844406170e-1
n = 200 , left side = 5.21861806171967e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98809959275117e-1
n = 500 , left side = 1.97011789902637e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53021780855807e-1
```

x^4

```
n = 10 , left side = 1.73481972152748e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.27705261474524e-1
n = 20 , left side = 8.51542996669777e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.21936231869927e-1
n = 50 , left side = 2.11276066122370e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.88121888098755e-1
n = 100 , left side = 8.32900734622635e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.42859635804732e-1
n = 200 , left side = 3.64725636378598e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00381320973051e-1
n = 500 , left side = 1.33955460912746e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53652344145706e-1
```

x^{10}

```
n = 10 , left side = 1.10749793713100e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.90437439914172e-1
n = 20 , left side = 2.99164984311764e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.77174033105728e-1
```

```
n = 50 , left side = 2.21641063046967e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07033084080522e-1
n = 100 , left side = 5.38176664980687e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50650466485977e-1
n = 200 , left side = 1.86220228286419e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03842357108551e-1
n = 500 , left side = 5.86797479887602e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54933219006845e-1


-------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 6.82869415554089e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.32900292071863e-1
n = 20 , left side = 1.33687024165273e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93721829120377e-1
n = 50 , left side = 1.63484873126000e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07614645979732e-1
n = 100 , left side = 3.99163819984172e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50789479330974e-1
n = 200 , left side = 9.92641198009903e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03929313217036e-1
n = 500 , left side = 1.58592157954995e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54976039539038e-1
```

$$x$$

```
n = 10 , left side = 3.69989252549092e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.64188308372363e-1
n = 20 , left side = 2.00667707762198e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.05083854459282e-1
n = 50 , left side = 4.68947442600065e-7
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249025763549e-1
n = 100 , left side = 4.87998530473988e-13
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150470e-1
n = 200 , left side = 2.77555756156289e-15
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336834e-1
n = 500 , left side = 8.32667268468867e-15
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754825e-1
```

x^2

```
n = 10 , left side = 5.10082471986903e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.50178986428582e-1
n = 20 , left side = 2.49080317693943e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.82182499767510e-1
n = 50 , left side = 4.49384626232519e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04755648448667e-1
n = 100 , left side = 1.12364228202105e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50065000868937e-1
n = 200 , left side = 2.80910570690518e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03747666766146e-1
n = 500 , left side = 4.49456913103607e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54946953063523e-1
```

x^3

```
n = 10 , left side = 8.05630984900003e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.20624135137272e-1
n = 20 , left side = 3.80461039225837e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69044427614321e-1
n = 50 , left side = 6.74097872481336e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.02508515986178e-1
n = 100 , left side = 1.68546342326287e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49503179727695e-1
n = 200 , left side = 4.21365856036027e-4
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03607211480801e-1
n = 500 , left side = 6.74185369657354e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54924480217868e-1
```

x^4

```
n = 10 , left side = 9.56553116582347e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.05531921969038e-1
n = 20 , left side = 4.04460065482376e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.66644524988667e-1
n = 50 , left side = 6.82428115714757e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.02425213553844e-1
n = 100 , left side = 1.69067633411174e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49497966816846e-1
n = 200 , left side = 4.21691662969348e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03606885673868e-1
n = 500 , left side = 6.74268776228587e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54924471877211e-1
```

x^{10}

```
n = 10 , left side = 6.41007338310152e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37086499796257e-1
n = 20 , left side = 1.60696284616728e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.91020903075232e-1
n = 50 , left side = 1.11077199106476e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08138722719927e-1
n = 100 , left side = 2.15342826708947e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50973300324249e-1
n = 200 , left side = 5.04590230707082e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03978118313766e-1
n = 500 , left side = 7.92802313141143e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54983970731702e-1
```

```
-------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.07301387715013e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.50457094855771e-1
n = 20 , left side = 2.97571823804906e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.77333349156414e-1
n = 50 , left side = 1.27350011672377e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96514493543754e-1
n = 100 , left side = 6.51783250464703e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44670810646311e-1
n = 200 , left side = 3.29808623350129e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00730491103336e-1
n = 500 , left side = 1.32886374798369e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53663035006850e-1
```

$$x$$

```
n = 10 , left side = 1.20447685814792e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.80739547812481e-1
n = 20 , left side = 6.30698667036227e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.44020664833282e-1
n = 50 , left side = 2.52371937308606e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.84012300980131e-1
n = 100 , left side = 1.26185968662246e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38570046284733e-1
n = 200 , left side = 6.30929843311230e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97719278903725e-1
n = 500 , left side = 2.52371937324492e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52468179381589e-1
```

x^2

```
n = 10 , left side = 1.62756694980023e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.38430538647249e-1
n = 20 , left side = 7.46838649241749e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.32406666612730e-1
n = 50 , left side = 2.70977519295812e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.82151742781411e-1
n = 100 , left side = 1.30837364161245e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38104906734833e-1
n = 200 , left side = 6.42558332058729e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97602994016250e-1
n = 500 , left side = 2.54232495524092e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52449573799593e-1
```

x^3

```
n = 10 , left side = 1.64347075123365e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.36840158503908e-1
n = 20 , left side = 6.64134500436401e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.40677081493264e-1
n = 50 , left side = 2.18274504096767e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.87422044301315e-1
n = 100 , left side = 1.01752467012584e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41013396449700e-1
n = 200 , left side = 4.90809987188921e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99120477464948e-1
n = 500 , left side = 1.92080662074161e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53071092134092e-1
```

x^4

```
n = 10 , left side = 1.49500436265984e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.51686797361288e-1
n = 20 , left side = 5.27597929216736e-2
```

```
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.54330738615231e-1
        n = 50 , left side = 1.56378486874087e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.93611646023583e-1
        n = 100 , left side = 7.03487339252017e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.44153769758438e-1
        n = 200 , left side = 3.33251686577100e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.00696060471066e-1
        n = 500 , left side = 1.28998659313402e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53701912161700e-1
```

$$x^{10}$$

```
        n = 10 , left side = 6.20895791074231e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.39097654519849e-1
        n = 20 , left side = 7.49326050835418e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.99597271028550e-1
        n = 50 , left side = 9.67306970003267e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08282187740988e-1
        n = 100 , left side = 3.43473435582427e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50845169715376e-1
        n = 200 , left side = 1.45410186988313e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03883167149849e-1
        n = 500 , left side = 5.26675084446080e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54939231246389e-1


--------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.96662765819202e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.81520957045352e-1
        n = 20 , left side = 1.37949642558639e-2
                1/n^(3/10) = 4.07090531536904e-1
```

```
          difference = 3.93295567281041e-1
n = 50 , left side = 6.20456393446962e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03044930776522e-1
n = 100 , left side = 3.21865168009463e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47969991470863e-1
n = 200 , left side = 1.63902388375418e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02389553453083e-1
n = 500 , left side = 6.62832648814309e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54329066106019e-1
```

x

```
n = 10 , left side = 5.98756493877612e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.41311584239511e-1
n = 20 , left side = 3.15342098959860e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.75556321640918e-1
n = 50 , left side = 1.26185924322845e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96630902278707e-1
n = 100 , left side = 6.30929621654933e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44879346934409e-1
n = 200 , left side = 3.15464810827466e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00873929228562e-1
n = 500 , left side = 1.26185924330987e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53730039511524e-1
```

x^2

```
n = 10 , left side = 9.22786128037476e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.08908620823525e-1
n = 20 , left side = 4.01698401778963e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.66920691359008e-1
n = 50 , left side = 1.40014633095062e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95248031401486e-1
n = 100 , left side = 6.65501393596483e-3
          1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.44533629214993e-1
n = 200 , left side = 3.24107753812854e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00787499798708e-1
n = 500 , left side = 1.27568795208649e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53716210802747e-1
```

x^3

```
n = 10 , left side = 9.79904495394282e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.03196784087844e-1
n = 20 , left side = 3.73549249176909e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69735606619214e-1
n = 50 , left side = 1.15865818377543e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.97662912873237e-1
n = 100 , left side = 5.25659014127817e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.45932053009680e-1
n = 200 , left side = 2.49638540095468e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01532191935882e-1
n = 500 , left side = 9.67185826845273e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54024712927988e-1
```

x^4

```
n = 10 , left side = 9.08480780580739e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.10339155569198e-1
n = 20 , left side = 3.04966491943750e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.76593882342529e-1
n = 50 , left side = 8.48735641559006e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.00762138295402e-1
n = 100 , left side = 3.68575070490398e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47502892446054e-1
n = 200 , left side = 1.70850624998014e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02320071086857e-1
n = 500 , left side = 6.51770056364582e-4
```

```
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54340128698469e-1
```

$$x^{10}$$

```
        n = 10 , left side = 3.53492597556091e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.65837973871663e-1
        n = 20 , left side = 4.33489239958231e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.02755639137322e-1
        n = 50 , left side = 5.62358290940473e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08687136420051e-1
        n = 100 , left side = 1.91231443139256e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50997411707819e-1
        n = 200 , left side = 7.76090693604399e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03950968267477e-1
        n = 500 , left side = 2.71241857308545e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54964774569103e-1


--------------------------------------------------------------------------------
A = 3, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.51416822334619e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.86045551393810e-1
        n = 20 , left side = 2.85210202437432e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.04238429512530e-1
        n = 50 , left side = 4.34807176805501e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.08814687534186e-1
        n = 100 , left side = 1.08105548851654e-4
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51080537602106e-1
        n = 200 , left side = 2.69899968329530e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.04001587340004e-1
        n = 500 , left side = 4.31677870245360e-6
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54987581976131e-1
```

x

```
n = 10 , left side = 1.78232033114016e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.99404913296132e-1
n = 20 , left side = 6.49176831929737e-6
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07084039768585e-1
n = 50 , left side = 4.17016503462199e-13
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494710575e-1
n = 100 , left side = 4.78248078723831e-25
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 6.56476698581624e-49
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 1.75858371069954e-120
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 2.77130968204319e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.73474136806840e-1
n = 20 , left side = 7.63760747828129e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.99452924058623e-1
n = 50 , left side = 1.22364269385997e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08025852017132e-1
n = 100 , left side = 3.05910673624321e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50882732477334e-1
n = 200 , left side = 7.64776684060802e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03952099668431e-1
n = 500 , left side = 1.22364269449728e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54979662327889e-1
```

x^3

```
n = 10 , left side = 4.21089274683114e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.59078306158961e-1
n = 20 , left side = 1.14590950673837e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95631436469521e-1
n = 50 , left side = 1.83546404098520e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07414030670006e-1
n = 100 , left side = 4.58866010436481e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50729777140522e-1
n = 200 , left side = 1.14716502609120e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03913860834228e-1
n = 500 , left side = 1.83546404174592e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54973544114416e-1
```

x^4

```
n = 10 , left side = 4.48981405967206e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.56289093030552e-1
n = 20 , left side = 1.16876094450624e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95402922091842e-1
n = 50 , left side = 1.84136113484672e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07408133576145e-1
n = 100 , left side = 4.59234578807562e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50729408572150e-1
n = 200 , left side = 1.14739538132313e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03913837798705e-1
n = 500 , left side = 1.83552301268530e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54973543524707e-1
```

x^{10}

```
n = 10 , left side = 1.92191896311521e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.81968043996120e-1
n = 20 , left side = 2.29438013358182e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.04796151403323e-1
```

```
n = 50 , left side = 2.35272607344729e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09014222103647e-1
n = 100 , left side = 5.49955285695450e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51133647622388e-1
n = 200 , left side = 1.35191249020858e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04015058211935e-1
n = 500 , left side = 2.15287022409081e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54989745884610e-1


-------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.75537791341353e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.58673986882703e-1
n = 20 , left side = 5.01538635844617e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.73452934165517e-1
n = 50 , left side = 4.44369247935306e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.69844314437789e-2
n = 100 , left side = 2.45022894564701e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.54977105435299e-2
n = 200 , left side = 1.27759995447253e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.79346785739294e-2
n = 500 , left side = 5.24594907413400e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.94754104758618e-2
```

$$x$$

```
n = 10 , left side = 4.11343756864777e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.75093390330360e-1
n = 20 , left side = 1.45618700583181e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 7.79880971667976e-2
n = 50 , left side = 9.91789471280212e-2
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 4.22424091092883e-2
n = 100 , left side = 5.04725022113053e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.95274977886947e-2
n = 200 , left side = 2.52371901407978e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.54734879778569e-2
n = 500 , left side = 1.00948760571513e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.46264834928445e-2
```

x^2

```
n = 10 , left side = 2.04066900796696e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.12160865220142e-1
n = 20 , left side = 2.30763289774789e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -7.15649202480970e-3
n = 50 , left side = 1.25781802608068e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.56395536292415e-2
n = 100 , left side = 5.74136341424519e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 4.25863658575481e-2
n = 200 , left side = 2.69727481887477e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.37379299299071e-2
n = 500 , left side = 1.03725653449941e-2
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.43487942050017e-2
```

x^3

```
n = 10 , left side = 2.22265806381169e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 9.39619596356691e-2
n = 20 , left side = 2.51457751362967e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.78509536129884e-2
n = 50 , left side = 1.19898883779918e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 2.15224724573919e-2
n = 100 , left side = 4.90594926169464e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 5.09405073830536e-2
n = 200 , left side = 2.16304835738007e-2
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 4.90801945448541e-2
n = 500 , left side = 7.99404322403299e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.67273163259628e-2
```

x^4

```
n = 10 , left side = 2.53907045566462e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 6.23207204503761e-2
n = 20 , left side = 2.47162291851446e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = -2.35554941014671e-2
n = 50 , left side = 1.02722340452672e-1
          1/n^(1/2) = 1.41421356237310e-1
          difference = 3.86990157846374e-2
n = 100 , left side = 3.73888726022915e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.26111273977085e-2
n = 200 , left side = 1.54300915414019e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.52805865772528e-2
n = 500 , left side = 5.47692354028259e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.92444360097132e-2
```

x^{10}

```
n = 10 , left side = 1.92937097609011e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.23290668407827e-1
n = 20 , left side = 1.49559668336496e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 7.40471294134828e-2
n = 50 , left side = 2.75696561028719e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13851700134438e-1
n = 100 , left side = 3.77940987916722e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.62205901208328e-2
n = 200 , left side = 9.30819259943895e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.97798588587109e-2
n = 500 , left side = 2.52816609553913e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44685429404419e-2
```

```
-------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.07961176896914e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.08266589119924e-1
n = 20 , left side = 1.46187478380900e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.08988049911889e-1
n = 50 , left side = 1.94917100471842e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21929646190125e-1
n = 100 , left side = 1.16676593427210e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.83323406572790e-2
n = 200 , left side = 6.24728154686105e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.44633965717937e-2
n = 500 , left side = 2.60078820414289e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.21205713458529e-2
```

$$x$$

```
n = 10 , left side = 5.43674197616052e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.61860346255233e-1
n = 20 , left side = 5.97131060056814e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.63893691744298e-1
n = 50 , left side = 4.94969863858885e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.19243698514210e-2
n = 100 , left side = 2.52362028556755e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.47637971443245e-2
n = 200 , left side = 1.26185950703714e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.80920830482833e-2
n = 500 , left side = 5.04743802855501e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.96739215214408e-2
```

x^2

```
n = 10 , left side = 1.32556015739249e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.83671750277589e-1
n = 20 , left side = 1.37272215541269e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.63345822087102e-2
n = 50 , left side = 6.90260023884016e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.23953538489079e-2
n = 100 , left side = 3.02671339674381e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 6.97328660325619e-2
n = 200 , left side = 1.38764662941516e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68342118245031e-2
n = 500 , left side = 5.24869742446599e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.94726621255298e-2
```

x^3

```
n = 10 , left side = 1.40543119011788e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.75684647005050e-1
n = 20 , left side = 1.58712613139094e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.48941846108849e-2
n = 50 , left side = 6.88292839445783e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.25920722927312e-2
n = 100 , left side = 2.68220350961968e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.31779649038032e-2
n = 200 , left side = 1.13943523499742e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.93163257686806e-2
n = 500 , left side = 4.09025796482596e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.06311015851698e-2
```

x^4

```
n = 10 , left side = 1.86776861573453e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.29450904443385e-1
n = 20 , left side = 1.60981190569593e-1
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.26256071803857e-2
n = 50 , left side = 6.02023592387208e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.12189969985887e-2
n = 100 , left side = 2.09592607620394e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.90407392379606e-2
n = 200 , left side = 8.28942525108543e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.24212528675693e-2
n = 500 , left side = 2.83134554214828e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18900140078475e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.41044486023075e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.75183279993763e-1
n = 20 , left side = 9.34299576253183e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.30176840124661e-1
n = 50 , left side = 1.54202118287511e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.26001144408558e-1
n = 100 , left side = 2.17644194948917e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.78235580505108e-2
n = 200 , left side = 5.32154058320025e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.01785240603347e-2
n = 500 , left side = 1.37121741177569e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45842378088182e-2


-------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.90388797997796e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.25838968019042e-1
n = 20 , left side = 6.56235719263559e-2
          1/n^(1/2) = 2.23606797749979e-1
```

```
          difference = 1.57983225823623e-1
n = 50 , left side = 7.42709237196895e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33994263865341e-1
n = 100 , left side = 1.59797012007034e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.84020298799297e-2
n = 200 , left side = 3.90256075863404e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03204220427913e-2
n = 500 , left side = 6.20761738443498e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46592833761514e-2
```

x

```
n = 10 , left side = 1.82048832905811e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.34178933111027e-1
n = 20 , left side = 3.98117744785634e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.83795023271416e-1
n = 50 , left side = 5.34964466007426e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40886391771302e-1
n = 100 , left side = 5.17768589392009e-7
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99994822314106e-2
n = 200 , left side = 5.39956968026445e-13
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781181148e-2
n = 500 , left side = 3.38618022510673e-15
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499924e-2
```

x^2

```
n = 10 , left side = 5.88172688754145e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.57410497141423e-1
n = 20 , left side = 4.49462410450516e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78660556704927e-1
n = 50 , left side = 1.67425450005100e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24678811236800e-1
n = 100 , left side = 4.39377386083023e-3
          1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 9.56062261391698e-2
n = 200 , left side = 1.09864228194106e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.96120358367137e-2
n = 500 , left side = 1.75782765241383e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45455767847544e-2
```

x^3

```
n = 10 , left side = 4.95124186505144e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.66715347366324e-1
n = 20 , left side = 7.32951186472261e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.50311679102753e-1
n = 50 , left side = 2.53238530046482e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.16097503232661e-1
n = 100 , left side = 6.59089508039287e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.34091049196071e-2
n = 200 , left side = 1.64796342317008e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.90627146954847e-2
n = 500 , left side = 2.63674147862936e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.44576854021329e-2
```

x^4

```
n = 10 , left side = 1.22860489069735e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.93367276947103e-1
n = 20 , left side = 8.73610920723158e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.36245705677663e-1
n = 50 , left side = 2.64418118614758e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.14979544375834e-1
n = 100 , left side = 6.67154569006664e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.33284543099334e-2
n = 200 , left side = 1.65301091267021e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.90576672059845e-2
n = 500 , left side = 2.63803363596202e-4
```

```
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.44575561863996e-2
```

$$x^{10}$$

```
        n = 10 , left side = 9.63190321145369e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.19908733902301e-1
        n = 20 , left side = 5.39093328633610e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.69697464886618e-1
        n = 50 , left side = 8.17939164535952e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.33241964591950e-1
        n = 100 , left side = 1.08271876334556e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.89172812366544e-2
        n = 200 , left side = 2.10380112720596e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05002980059342e-2
        n = 500 , left side = 3.13261214726040e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46900334285232e-2


--------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 5.10916196819691e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.65136146334869e-1
        n = 20 , left side = 5.13943806064787e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.72212417143500e-1
        n = 50 , left side = 2.44712193497084e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.16950136887601e-1
        n = 100 , left side = 1.27678015370490e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.72321984629510e-2
        n = 200 , left side = 6.52631215849020e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.41843659601646e-2
        n = 500 , left side = 2.64623666471886e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.20751228852769e-2
```

x

```
n = 10 , left side = 1.52194639517326e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.64033126499512e-1
n = 20 , left side = 1.19795287408221e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.03811510341758e-1
n = 50 , left side = 5.04726774830794e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.09486787542301e-2
n = 100 , left side = 2.52371901410023e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.47628098589977e-2
n = 200 , left side = 1.26185950714269e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.80920830472278e-2
n = 500 , left side = 5.04743802857466e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.96739215214211e-2
```

x^2

```
n = 10 , left side = 2.42445014784458e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.37827512323802e-2
n = 20 , left side = 1.59306359409795e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.43004383401838e-2
n = 50 , left side = 5.75139027256352e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.39074535116743e-2
n = 100 , left side = 2.69977481890565e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.30022518109435e-2
n = 200 , left side = 1.30587345836964e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.76519435349584e-2
n = 500 , left side = 5.11786035053458e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.96034991994612e-2
```

x^3

```
n = 10 , left side = 2.66755167489386e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.94725985274516e-2
n = 20 , left side = 1.58629980626335e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.49768171236436e-2
n = 50 , left side = 4.92249527212995e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.21964035160100e-2
n = 100 , left side = 2.16698763634239e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.83301236365761e-2
n = 200 , left side = 1.01367989077389e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.05738792109159e-2
n = 500 , left side = 3.89202117786197e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.08293383721338e-2
```

x^4

```
n = 10 , left side = 2.65292194687112e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 5.09355713297263e-2
n = 20 , left side = 1.42271429061233e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.13353686887457e-2
n = 50 , left side = 3.75736754012363e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.03847680836073e-1
n = 100 , left side = 1.54716380790208e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.45283619209792e-2
n = 200 , left side = 6.99541301099366e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37152651076611e-2
n = 500 , left side = 2.63098670431283e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.20903728456830e-2
```

x^{10}

```
n = 10 , left side = 1.76981933661658e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.39245832355180e-1
n = 20 , left side = 5.30759628976999e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.70530834852279e-1
```

```
n = 50 , left side = 3.83563208999783e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.37585724147312e-1
n = 100 , left side = 9.38095725961607e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.90619042740384e-2
n = 200 , left side = 3.37944406623273e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03727337120315e-2
n = 500 , left side = 1.11774573310479e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46095849766853e-2


--------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.37606830853123e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.02467082931526e-1
n = 20 , left side = 2.07942408318349e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.02812556918144e-1
n = 50 , left side = 1.16338810728552e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.29787475164454e-1
n = 100 , left side = 6.23874050740880e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.37612594925912e-2
n = 200 , left side = 3.22731032813994e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.74833677905148e-2
n = 500 , left side = 1.31741761047521e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.34039419395206e-2
```

$$x$$

```
n = 10 , left side = 6.41256145303283e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52102151486510e-1
n = 20 , left side = 5.94887988577303e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.64117998892249e-1
n = 50 , left side = 2.52362954947459e-2
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.16185060742564e-1
n = 100 , left side = 1.26185950704787e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.73814049295213e-2
n = 200 , left side = 6.30929753571374e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.44013805829410e-2
n = 500 , left side = 2.52371901428061e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.21976405357152e-2
```

x^2

```
n = 10 , left side = 1.45653364930992e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.70574401085846e-1
n = 20 , left side = 8.92331669463914e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.34373630803588e-1
n = 50 , left side = 3.03672736409643e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11054082596345e-1
n = 100 , left side = 1.39014662943086e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.60985337056915e-2
n = 200 , left side = 6.63001534179952e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.40806627768552e-2
n = 500 , left side = 2.57503386325902e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.21463256867368e-2
```

x^3

```
n = 10 , left side = 1.69427755592478e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.46800010424360e-1
n = 20 , left side = 9.31942672923572e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.30412530457622e-1
n = 50 , left side = 2.69797695441467e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.14441586693163e-1
n = 100 , left side = 1.14327987447878e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.85672012552123e-2
n = 200 , left side = 5.21861806171967e-3
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.54920600569351e-2
n = 500 , left side = 1.97011789902637e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27512416509694e-2
```

x^4

```
n = 10 , left side = 1.73481972152748e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.42745793864090e-1
n = 20 , left side = 8.51542996669777e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.38452498083001e-1
n = 50 , left side = 2.11276066122370e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.20293749625073e-1
n = 100 , left side = 8.32900734622635e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.16709926537737e-2
n = 200 , left side = 3.64725636378598e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.70634217548688e-2
n = 500 , left side = 1.33955460912746e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33818049408683e-2
```

x^{10}

```
n = 10 , left side = 1.10749793713100e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.05477972303738e-1
n = 20 , left side = 2.99164984311764e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.93690299318803e-1
n = 50 , left side = 2.21641063046967e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39204945606840e-1
n = 100 , left side = 5.38176664980687e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94618233350193e-2
n = 200 , left side = 1.86220228286419e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05244578903683e-2
n = 500 , left side = 5.86797479887602e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46626798020070e-2
```

```
-------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 6.82869415554089e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.47940824461429e-1
n = 20 , left side = 1.33687024165273e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.10238095333452e-1
n = 50 , left side = 1.63484873126000e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39786507506050e-1
n = 100 , left side = 3.99163819984172e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96008361800158e-2
n = 200 , left side = 9.92641198009903e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06114139988538e-2
n = 500 , left side = 1.58592157954995e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47055003342003e-2
```

$$x$$

```
n = 10 , left side = 3.69989252549092e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.79228840761929e-1
n = 20 , left side = 2.00667707762198e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.21600120672357e-1
n = 50 , left side = 4.68947442600065e-7
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41420887289867e-1
n = 100 , left side = 4.87998530473988e-13
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999995120e-2
n = 200 , left side = 2.77555756156289e-15
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186520e-2
n = 500 , left side = 8.32667268468867e-15
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499875e-2
```

x^2

```
n = 10 , left side = 5.10082471986903e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.65219518818148e-1
n = 20 , left side = 2.49080317693943e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.98698765980585e-1
n = 50 , left side = 4.49384626232519e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36927509974984e-1
n = 100 , left side = 1.12364228202105e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.88763577179790e-2
n = 200 , left side = 2.80910570690518e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04297675479642e-2
n = 500 , left side = 4.49456913103607e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46764138586854e-2
```

x^3

```
n = 10 , left side = 8.05630984900003e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.35664667526838e-1
n = 20 , left side = 3.80461039225837e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.85560693827395e-1
n = 50 , left side = 6.74097872481336e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34680377512496e-1
n = 100 , left side = 1.68546342326287e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.83145365767371e-2
n = 200 , left side = 4.21365856036027e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02893122626187e-2
n = 500 , left side = 6.74185369657354e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46539410130301e-2
```

x^4

```
n = 10 , left side = 9.56553116582347e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.20572454358603e-1
n = 20 , left side = 4.04460065482376e-2
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.83160791201741e-1
n = 50 , left side = 6.82428115714757e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34597075080162e-1
n = 100 , left side = 1.69067633411174e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.83093236658883e-2
n = 200 , left side = 4.21691662969348e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02889864556854e-2
n = 500 , left side = 6.74268776228587e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46539326723729e-2
```

$$x^{10}$$

```
n = 10 , left side = 6.41007338310152e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52127032185823e-1
n = 20 , left side = 1.60696284616728e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.07537169288306e-1
n = 50 , left side = 1.11077199106476e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40310584246245e-1
n = 100 , left side = 2.15342826708947e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97846571732911e-2
n = 200 , left side = 5.04590230707082e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06602190955840e-2
n = 500 , left side = 7.92802313141143e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47134315268644e-2


-------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.07301387715013e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.65497627245337e-1
n = 20 , left side = 2.97571823804906e-2
          1/n^(1/2) = 2.23606797749979e-1
```

```
          difference = 1.93849615369488e-1
n = 50 , left side = 1.27350011672377e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28686355070072e-1
n = 100 , left side = 6.51783250464703e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.34821674953530e-2
n = 200 , left side = 3.29808623350129e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.74125918851535e-2
n = 500 , left side = 1.32886374798369e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33924958020121e-2
```

x

```
n = 10 , left side = 1.20447685814792e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.95780080202046e-1
n = 20 , left side = 6.30698667036227e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.60536931046356e-1
n = 50 , left side = 2.52371937308606e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.16184162506449e-1
n = 100 , left side = 1.26185968662246e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.73814031337754e-2
n = 200 , left side = 6.30929843311230e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.44013796855425e-2
n = 500 , left side = 2.52371937324492e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.21976401767509e-2
```

x^2

```
n = 10 , left side = 1.62756694980023e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.53471071036815e-1
n = 20 , left side = 7.46838649241749e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.48922932825804e-1
n = 50 , left side = 2.70977519295812e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.14323604307728e-1
n = 100 , left side = 1.30837364161245e-2
          1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 8.69162635838755e-2
n = 200 , left side = 6.42558332058729e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.42850947980675e-2
n = 500 , left side = 2.54232495524092e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.21790345947549e-2
```

x^3

```
n = 10 , left side = 1.64347075123365e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.51880690893473e-1
n = 20 , left side = 6.64134500436401e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.57193347706339e-1
n = 50 , left side = 2.18274504096767e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.19593905827633e-1
n = 100 , left side = 1.01752467012584e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.98247532987416e-2
n = 200 , left side = 4.90809987188921e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.58025782467656e-2
n = 500 , left side = 1.92080662074161e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.28005529292542e-2
```

x^4

```
n = 10 , left side = 1.49500436265984e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.66727329750854e-1
n = 20 , left side = 5.27597929216736e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.70847004828305e-1
n = 50 , left side = 1.56378486874087e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.25783507549901e-1
n = 100 , left side = 7.03487339252017e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.29651266074798e-2
n = 200 , left side = 3.33251686577100e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.73781612528837e-2
n = 500 , left side = 1.28998659313402e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.34313729568618e-2
```

$$x^{10}$$

```
n = 10 , left side = 6.20895791074231e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.54138186909415e-1
n = 20 , left side = 7.49326050835418e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.16113537241625e-1
n = 50 , left side = 9.67306970003267e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40454049267306e-1
n = 100 , left side = 3.43473435582427e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96565265644176e-2
n = 200 , left side = 1.45410186988313e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05652679316664e-2
n = 500 , left side = 5.26675084446080e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46686920415512e-2
```

A = 3, Power = 1/2, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96662765819202e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96561489434918e-1
n = 20 , left side = 1.37949642558639e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.09811833494115e-1
n = 50 , left side = 6.20456393446962e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.35216792302840e-1
n = 100 , left side = 3.21865168009463e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.67813483199054e-2
n = 200 , left side = 1.63902388375418e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.90716542349006e-2
n = 500 , left side = 6.62832648814309e-4
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40585269011815e-2
```

x

```
n = 10 , left side = 5.98756493877612e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.56352116629077e-1
n = 20 , left side = 3.15342098959860e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.92072587853993e-1
n = 50 , left side = 1.26185924322845e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28802763805025e-1
n = 100 , left side = 6.30929621654933e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.36907037834507e-2
n = 200 , left side = 3.15464810827466e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.75560300103801e-2
n = 500 , left side = 1.26185924330987e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.34595003066859e-2
```

x^2

```
n = 10 , left side = 9.22786128037476e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.23949153213090e-1
n = 20 , left side = 4.01698401778963e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.83436957572083e-1
n = 50 , left side = 1.40014633095062e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27419892927803e-1
n = 100 , left side = 6.65501393596483e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.33449860640352e-2
n = 200 , left side = 3.24107753812854e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.74696005805262e-2
n = 500 , left side = 1.27568795208649e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.34456715979093e-2
```

x^3

```
n = 10 , left side = 9.79904495394282e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.18237316477410e-1
n = 20 , left side = 3.73549249176909e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.86251872832288e-1
n = 50 , left side = 1.15865818377543e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.29834774399555e-1
n = 100 , left side = 5.25659014127817e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.47434098587218e-2
n = 200 , left side = 2.49638540095468e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82142927177001e-2
n = 500 , left side = 9.67185826845273e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37541737231505e-2
```

x^4

```
n = 10 , left side = 9.08480780580739e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.25379687958764e-1
n = 20 , left side = 3.04966491943750e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.93110148555604e-1
n = 50 , left side = 8.48735641559006e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.32933999821719e-1
n = 100 , left side = 3.68575070490398e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.63142492950960e-2
n = 200 , left side = 1.70850624998014e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.90021718686746e-2
n = 500 , left side = 6.51770056364582e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40695894936312e-2
```

x^{10}

```
n = 10 , left side = 3.53492597556091e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.80878506261229e-1
n = 20 , left side = 4.33489239958231e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.19271905350397e-1
```

```
n = 50 , left side = 5.62358290940473e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40858997946369e-1
n = 100 , left side = 1.91231443139256e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98087685568607e-2
n = 200 , left side = 7.76090693604399e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06330690492943e-2
n = 500 , left side = 2.71241857308545e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46942353642649e-2


--------------------------------------------------------------------------------
A = 3, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.51416822334619e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.01086083783376e-1
n = 20 , left side = 2.85210202437432e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20754695725605e-1
n = 50 , left side = 4.34807176805501e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40986549060504e-1
n = 100 , left side = 1.08105548851654e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98918944511483e-2
n = 200 , left side = 2.69899968329530e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06836881218218e-2
n = 500 , left side = 4.31677870245360e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47170427712933e-2
```

$$x$$

```
n = 10 , left side = 1.78232033114016e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.14445445685698e-1
n = 20 , left side = 6.49176831929737e-6
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23600305981660e-1
n = 50 , left side = 4.17016503462199e-13
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356236892e-1
n = 100 , left side = 4.78248078723831e-25
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 6.56476698581624e-49
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 1.75858371069954e-120
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

x^2

```
n = 10 , left side = 2.77130968204319e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.88514669196406e-1
n = 20 , left side = 7.63760747828129e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.15969190271698e-1
n = 50 , left side = 1.22364269385997e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40197713543450e-1
n = 100 , left side = 3.05910673624321e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96940893263757e-2
n = 200 , left side = 7.64776684060802e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06342004502487e-2
n = 500 , left side = 1.22364269449728e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47091231230508e-2
```

x^3

```
n = 10 , left side = 4.21089274683114e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.74118838548527e-1
n = 20 , left side = 1.14590950673837e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.12147702682595e-1
n = 50 , left side = 1.83546404098520e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39585892196324e-1
n = 100 , left side = 4.58866010436481e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95411339895635e-2
n = 200 , left side = 1.14716502609120e-4
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05959616160456e-2
n = 500 , left side = 1.83546404174592e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47030049095783e-2
```

x^4

```
n = 10 , left side = 4.48981405967206e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.71329625420117e-1
n = 20 , left side = 1.16876094450624e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.11919188304917e-1
n = 50 , left side = 1.84136113484672e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39579995102463e-1
n = 100 , left side = 4.59234578807562e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95407654211924e-2
n = 200 , left side = 1.14739538132313e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05959385805224e-2
n = 500 , left side = 1.83552301268530e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47030043198689e-2
```

x^{10}

```
n = 10 , left side = 1.92191896311521e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.97008576385686e-1
n = 20 , left side = 2.29438013358182e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.21312417616397e-1
n = 50 , left side = 2.35272607344729e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41186083629965e-1
n = 100 , left side = 5.49955285695450e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99450044714305e-2
n = 200 , left side = 1.35191249020858e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06971589937527e-2
n = 500 , left side = 2.15287022409081e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47192066797717e-2
```

```
-------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.75537791341353e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.41972452362753e-1
n = 20 , left side = 5.01538635844617e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.26689390271174e-2
n = 50 , left side = 4.44369247935306e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.02357758642051e-2
n = 100 , left side = 2.45022894564701e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.53084275988796e-2
n = 200 , left side = 1.27759995447253e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.17303714022492e-2
n = 500 , left side = 5.24594907413400e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.65795116883032e-3
```

$$x$$

```
n = 10 , left side = 4.11343756864777e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.58391855810410e-1
n = 20 , left side = 1.45618700583181e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -2.27958979716023e-2
n = 50 , left side = 9.91789471280212e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -3.45062464702855e-2
n = 100 , left side = 5.04725022113053e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -1.06617851559555e-2
n = 200 , left side = 2.52371901407978e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -7.30819193823336e-4
n = 500 , left side = 1.00948760571513e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 2.80902418581301e-3
```

x^2

```
n = 10 , left side = 2.04066900796696e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.54066929980765e-3
n = 20 , left side = 2.30763289774789e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.07940487163210e-1
n = 50 , left side = 1.25781802608068e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -6.11091019503323e-2
n = 100 , left side = 5.74136341424519e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -1.76029170871021e-2
n = 200 , left side = 2.69727481887477e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = -2.46637724177317e-3
n = 500 , left side = 1.03725653449941e-2
          1/n^(7/10) = 1.29039002429643e-2
          difference = 2.53133489797023e-3
```

x^3

```
n = 10 , left side = 2.22265806381169e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -2.27395748842808e-2
n = 20 , left side = 2.51457751362967e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.28634948751388e-1
n = 50 , left side = 1.19898883779918e-1
          1/n^(7/10) = 6.46727006577358e-2
          difference = -5.52261831221819e-2
n = 100 , left side = 4.90594926169464e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = -9.24877556159666e-3
n = 200 , left side = 2.16304835738007e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.87588737317385e-3
n = 500 , left side = 7.99404322403299e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 4.90985701893133e-3
```

x^4

```
n = 10 , left side = 2.53907045566462e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -5.43808140695738e-2
n = 20 , left side = 2.47162291851446e-1
```

```
                1/n^(7/10) = 1.22822802611579e-1
                difference = -1.24339489239867e-1
        n = 50 , left side = 1.02722340452672e-1
                1/n^(7/10) = 6.46727006577358e-2
                difference = -3.80496397949363e-2
        n = 100 , left side = 3.73888726022915e-2
                1/n^(7/10) = 3.98107170553497e-2
                difference = 2.42184445305824e-3
        n = 200 , left side = 1.54300915414019e-2
                1/n^(7/10) = 2.45063709469745e-2
                difference = 9.07627940557259e-3
        n = 500 , left side = 5.47692354028259e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 7.42697670268173e-3
```

$$x^{10}$$

```
        n = 10 , left side = 1.92937097609011e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 6.58913388787680e-3
        n = 20 , left side = 1.49559668336496e-1
                1/n^(7/10) = 1.22822802611579e-1
                difference = -2.67368657249171e-2
        n = 50 , left side = 2.75696561028719e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 3.71030445548639e-2
        n = 100 , left side = 3.77940987916722e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.60313071761825e-2
        n = 200 , left side = 9.30819259943895e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.35755516870306e-2
        n = 500 , left side = 2.52816609553913e-4
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.26510836334104e-2


-------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.07961176896914e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 9.15650545999738e-2
        n = 20 , left side = 1.46187478380900e-2
                1/n^(7/10) = 1.22822802611579e-1
```

```
          difference = 1.08204054773489e-1
n = 50 , left side = 1.94917100471842e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.51809906105515e-2
n = 100 , left side = 1.16676593427210e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.81430577126287e-2
n = 200 , left side = 6.24728154686105e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.82590894001135e-2
n = 500 , left side = 2.60078820414289e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.03031120388214e-2
```

x

```
n = 10 , left side = 5.43674197616052e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.45158811735283e-1
n = 20 , left side = 5.97131060056814e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.31096966058977e-2
n = 50 , left side = 4.94969863858885e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.51757142718472e-2
n = 100 , left side = 2.52362028556755e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.45745141996742e-2
n = 200 , left side = 1.26185950703714e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.18877758766031e-2
n = 500 , left side = 5.04743802855501e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.85646221440932e-3
```

x^2

```
n = 10 , left side = 1.32556015739249e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.69702157576392e-2
n = 20 , left side = 1.37272215541269e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.44494129296897e-2
n = 50 , left side = 6.90260023884016e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -4.35330173066581e-3
n = 100 , left side = 3.02671339674381e-2
          1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 9.54358308791166e-3
n = 200 , left side = 1.38764662941516e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06299046528229e-2
n = 500 , left side = 5.24869742446599e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.65520281849834e-3
```

x^3

```
n = 10 , left side = 1.40543119011788e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.89831124850997e-2
n = 20 , left side = 1.58712613139094e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.58898105275150e-2
n = 50 , left side = 6.88292839445783e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = -4.15658328684251e-3
n = 100 , left side = 2.68220350961968e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.29886819591529e-2
n = 200 , left side = 1.13943523499742e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.31120185970003e-2
n = 500 , left side = 4.09025796482596e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.81364227813837e-3
```

x^4

```
n = 10 , left side = 1.86776861573453e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.27493699234346e-2
n = 20 , left side = 1.60981190569593e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.81583879580142e-2
n = 50 , left side = 6.02023592387208e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.47034141901495e-3
n = 100 , left side = 2.09592607620394e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.88514562933104e-2
n = 200 , left side = 8.28942525108543e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.62169456958891e-2
n = 500 , left side = 2.83134554214828e-3
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.00725547008160e-2
```

$$x^{10}$$

```
        n = 10 , left side = 1.41044486023075e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 5.84817454738132e-2
        n = 20 , left side = 9.34299576253183e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 2.93928449862607e-2
        n = 50 , left side = 1.54202118287511e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.92524888289847e-2
        n = 100 , left side = 2.17644194948917e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.76342751058606e-2
        n = 200 , left side = 5.32154058320025e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.39742168886545e-2
        n = 500 , left side = 1.37121741177569e-4
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.27667785017868e-2


--------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.90388797997796e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 9.13743349909243e-3
        n = 20 , left side = 6.56235719263559e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 5.71992306852231e-2
        n = 50 , left side = 7.42709237196895e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.72456082857668e-2
        n = 100 , left side = 1.59797012007034e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.82127469352794e-2
        n = 200 , left side = 3.90256075863404e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.41161148711111e-2
        n = 500 , left side = 6.20761738443498e-5
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28418240691200e-2
```

x

```
n = 10 , left side = 1.82048832905811e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.74773985910769e-2
n = 20 , left side = 3.98117744785634e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.30110281330157e-2
n = 50 , left side = 5.34964466007426e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41377361917283e-2
n = 100 , left side = 5.17768589392009e-7
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98101992867603e-2
n = 200 , left side = 5.39956968026445e-13
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709464345e-2
n = 500 , left side = 3.38618022510673e-15
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429609e-2
```

x^2

```
n = 10 , left side = 5.88172688754145e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.40708962621474e-1
n = 20 , left side = 4.49462410450516e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.78765615665274e-2
n = 50 , left side = 1.67425450005100e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.79301556572258e-2
n = 100 , left side = 4.39377386083023e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.54169431945195e-2
n = 200 , left side = 1.09864228194106e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.34077286650334e-2
n = 500 , left side = 1.75782765241383e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27281174777229e-2
```

x^3

```
n = 10 , left side = 4.95124186505144e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.50013812846374e-1
n = 20 , left side = 7.32951186472261e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.95276839643529e-2
n = 50 , left side = 2.53238530046482e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.93488476530876e-2
n = 100 , left side = 6.59089508039287e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.32198219749569e-2
n = 200 , left side = 1.64796342317008e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.28584075238044e-2
n = 500 , left side = 2.63674147862936e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.26402260951014e-2
```

x^4

```
n = 10 , left side = 1.22860489069735e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.66657424271527e-2
n = 20 , left side = 8.73610920723158e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.54617105392633e-2
n = 50 , left side = 2.64418118614758e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.82308887962600e-2
n = 100 , left side = 6.67154569006664e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.31391713652831e-2
n = 200 , left side = 1.65301091267021e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.28533600343043e-2
n = 500 , left side = 2.63803363596202e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.26400968793681e-2
```

x^{10}

```
n = 10 , left side = 9.63190321145369e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.03207199382351e-1
n = 20 , left side = 5.39093328633610e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.89134697482180e-2
```

```
n = 50 , left side = 8.17939164535952e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.64933090123762e-2
n = 100 , left side = 1.08271876334556e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.87279982920042e-2
n = 200 , left side = 2.10380112720596e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42959908342539e-2
n = 500 , left side = 3.13261214726040e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28725741214917e-2


-------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.10916196819691e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.48434611814919e-1
n = 20 , left side = 5.13943806064787e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.14284220051004e-2
n = 50 , left side = 2.44712193497084e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.02014813080274e-2
n = 100 , left side = 1.27678015370490e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.70429155183007e-2
n = 200 , left side = 6.52631215849020e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.79800587884843e-2
n = 500 , left side = 2.64623666471886e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.02576635782455e-2
```

$$x$$

```
n = 10 , left side = 1.52194639517326e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 4.73315919795621e-2
n = 20 , left side = 1.19795287408221e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.02751520335762e-3
n = 50 , left side = 5.04726774830794e-2
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.42000231746564e-2
n = 100 , left side = 2.52371901410023e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.45735269143474e-2
n = 200 , left side = 1.26185950714269e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.18877758755476e-2
n = 500 , left side = 5.04743802857466e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.85646221438967e-3
```

x^2

```
n = 10 , left side = 2.42445014784458e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.29187832875698e-2
n = 20 , left side = 1.59306359409795e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.64835567982161e-2
n = 50 , left side = 5.75139027256352e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 7.15879793210053e-3
n = 100 , left side = 2.69977481890565e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.28129688662933e-2
n = 200 , left side = 1.30587345836964e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.14476363632781e-2
n = 500 , left side = 5.11786035053458e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.78603989242975e-3
```

x^3

```
n = 10 , left side = 2.66755167489386e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -6.72289359924984e-2
n = 20 , left side = 1.58629980626335e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.58071780147563e-2
n = 50 , left side = 4.92249527212995e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 1.54477479364363e-2
n = 100 , left side = 2.16698763634239e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.81408406919259e-2
n = 200 , left side = 1.01367989077389e-2
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.43695720392356e-2
n = 500 , left side = 3.89202117786197e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.01187906510235e-3
```

x^4

```
n = 10 , left side = 2.65292194687112e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -6.57659631902237e-2
n = 20 , left side = 1.42271429061233e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.94486264496542e-2
n = 50 , left side = 3.75736754012363e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.70990252564995e-2
n = 100 , left side = 1.54716380790208e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.43390789763290e-2
n = 200 , left side = 6.99541301099366e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75109579359808e-2
n = 500 , left side = 2.63098670431283e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.02729135386515e-2
```

x^{10}

```
n = 10 , left side = 1.76981933661658e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.25442978352297e-2
n = 20 , left side = 5.30759628976999e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.97468397138791e-2
n = 50 , left side = 3.83563208999783e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.08370685677379e-2
n = 100 , left side = 9.38095725961607e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.88726213293881e-2
n = 200 , left side = 3.37944406623273e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41684265403512e-2
n = 500 , left side = 1.11774573310479e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27921256696538e-2
```

```
-------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.37606830853123e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.85765548411576e-1
n = 20 , left side = 2.07942408318349e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02028561779744e-1
n = 50 , left side = 1.16338810728552e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.30388195848805e-2
n = 100 , left side = 6.23874050740880e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.35719765479409e-2
n = 200 , left side = 3.22731032813994e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.12790606188346e-2
n = 500 , left side = 1.31741761047521e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15864826324891e-2
```

$$x$$

```
n = 10 , left side = 6.41256145303283e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.35400616966560e-1
n = 20 , left side = 5.94887988577303e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.33340037538488e-2
n = 50 , left side = 2.52362954947459e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.94364051629898e-2
n = 100 , left side = 1.26185950704787e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.71921219848710e-2
n = 200 , left side = 6.30929753571374e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.81970734112608e-2
n = 500 , left side = 2.52371901428061e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.03801812286837e-2
```

x^2

```
n = 10 , left side = 1.45653364930992e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.38728665658960e-2
n = 20 , left side = 8.92331669463914e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.35896356651877e-2
n = 50 , left side = 3.03672736409643e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.43054270167714e-2
n = 100 , left side = 1.39014662943086e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59092507610412e-2
n = 200 , left side = 6.63001534179952e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.78763556051750e-2
n = 500 , left side = 2.57503386325902e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.03288663797053e-2
```

x^3

```
n = 10 , left side = 1.69427755592478e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 3.00984759044099e-2
n = 20 , left side = 9.31942672923572e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.96285353192218e-2
n = 50 , left side = 2.69797695441467e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.76929311135890e-2
n = 100 , left side = 1.14327987447878e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.83779183105620e-2
n = 200 , left side = 5.21861806171967e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.92877528852548e-2
n = 500 , left side = 1.97011789902637e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09337823439379e-2
```

x^4

```
n = 10 , left side = 1.73481972152748e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.60442593441400e-2
n = 20 , left side = 8.51542996669777e-2
```

```
                1/n^(7/10) = 1.22822802611579e-1
                difference = 3.76685029446013e-2
        n = 50 , left side = 2.11276066122370e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 4.35450940454988e-2
        n = 100 , left side = 8.32900734622635e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.14817097091234e-2
        n = 200 , left side = 3.64725636378598e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.08591145831885e-2
        n = 500 , left side = 1.33955460912746e-3
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.15643456338369e-2
```

$$x^{10}$$

```
        n = 10 , left side = 1.10749793713100e-1
                1/n^(7/10) = 1.99526231496888e-1
                difference = 8.87764377837879e-2
        n = 20 , left side = 2.99164984311764e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 9.29063041804027e-2
        n = 50 , left side = 2.21641063046967e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.24562900272661e-2
        n = 100 , left side = 5.38176664980687e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.92725403903690e-2
        n = 200 , left side = 1.86220228286419e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43201507186881e-2
        n = 500 , left side = 5.86797479887602e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28452204949756e-2


--------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 6.82869415554089e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.31239289941479e-1
        n = 20 , left side = 1.33687024165273e-2
                1/n^(7/10) = 1.22822802611579e-1
```

```
          difference = 1.09454100195052e-1
n = 50 , left side = 1.63484873126000e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.30378519264757e-2
n = 100 , left side = 3.99163819984172e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94115532353656e-2
n = 200 , left side = 9.92641198009903e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44071068271735e-2
n = 500 , left side = 1.58592157954995e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28880410271688e-2
```

x

```
n = 10 , left side = 3.69989252549092e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.62527306241979e-1
n = 20 , left side = 2.00667707762198e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.20816125533957e-1
n = 50 , left side = 4.68947442600065e-7
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46722317102932e-2
n = 100 , left side = 4.87998530473988e-13
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170548617e-2
n = 200 , left side = 2.77555756156289e-15
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469717e-2
n = 500 , left side = 8.32667268468867e-15
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429560e-2
```

x^2

```
n = 10 , left side = 5.10082471986903e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.48517984298198e-1
n = 20 , left side = 2.49080317693943e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.79147708421848e-2
n = 50 , left side = 4.49384626232519e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.01788543954106e-2
n = 100 , left side = 1.12364228202105e-3
          1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 3.86870747733287e-2
n = 200 , left side = 2.80910570690518e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42254603762840e-2
n = 500 , left side = 4.49456913103607e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28589545516540e-2
```

x^3

```
n = 10 , left side = 8.05630984900003e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.18963133006888e-1
n = 20 , left side = 3.80461039225837e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.47766986889953e-2
n = 50 , left side = 6.74097872481336e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.79317219329224e-2
n = 100 , left side = 1.68546342326287e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.81252536320869e-2
n = 200 , left side = 4.21365856036027e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40850050909385e-2
n = 500 , left side = 6.74185369657354e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28364817059986e-2
```

x^4

```
n = 10 , left side = 9.56553116582347e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.03870919838653e-1
n = 20 , left side = 4.04460065482376e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.23767960633414e-2
n = 50 , left side = 6.82428115714757e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.78484195005882e-2
n = 100 , left side = 1.69067633411174e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.81200407212380e-2
n = 200 , left side = 4.21691662969348e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40846792840052e-2
n = 500 , left side = 6.74268776228587e-5
```

```
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28364733653415e-2
```

$$x^{10}$$

```
        n = 10 , left side = 6.41007338310152e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.35425497665873e-1
        n = 20 , left side = 1.60696284616728e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.06753174149906e-1
        n = 50 , left side = 1.11077199106476e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.35619286666710e-2
        n = 100 , left side = 2.15342826708947e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.95953742286408e-2
        n = 200 , left side = 5.04590230707082e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44559119239038e-2
        n = 500 , left side = 7.92802313141143e-6
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28959722198329e-2


-------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 5.07301387715013e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.48796092725387e-1
        n = 20 , left side = 2.97571823804906e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 9.30656202310884e-2
        n = 50 , left side = 1.27350011672377e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.19376994904981e-2
        n = 100 , left side = 6.51783250464703e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.32928845507027e-2
        n = 200 , left side = 3.29808623350129e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.12082847134732e-2
        n = 500 , left side = 1.32886374798369e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15750364949806e-2
```

x

```
n = 10 , left side = 1.20447685814792e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.90785456820962e-2
n = 20 , left side = 6.30698667036227e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.97529359079563e-2
n = 50 , left side = 2.52371937308606e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.94355069268752e-2
n = 100 , left side = 1.26185968662246e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.71921201891251e-2
n = 200 , left side = 6.30929843311230e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.81970725138622e-2
n = 500 , left side = 2.52371937324492e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.03801808697194e-2
```

x^2

```
n = 10 , left side = 1.62756694980023e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 3.67695365168652e-2
n = 20 , left side = 7.46838649241749e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.81389376874042e-2
n = 50 , left side = 2.70977519295812e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.75749487281546e-2
n = 100 , left side = 1.30837364161245e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.67269806392252e-2
n = 200 , left side = 6.42558332058729e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.80807876263872e-2
n = 500 , left side = 2.54232495524092e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.03615752877234e-2
```

x^3

```
n = 10 , left side = 1.64347075123365e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 3.51791563735233e-2
n = 20 , left side = 6.64134500436401e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.64093525679389e-2
n = 50 , left side = 2.18274504096767e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.28452502480591e-2
n = 100 , left side = 1.01752467012584e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.96354703540914e-2
n = 200 , left side = 4.90809987188921e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.95982710750853e-2
n = 500 , left side = 1.92080662074161e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09830936222227e-2
```

x^4

```
n = 10 , left side = 1.49500436265984e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.00257952309041e-2
n = 20 , left side = 5.27597929216736e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.00630096899054e-2
n = 50 , left side = 1.56378486874087e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.90348519703270e-2
n = 100 , left side = 7.03487339252017e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.27758436628296e-2
n = 200 , left side = 3.33251686577100e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.11738540812035e-2
n = 500 , left side = 1.28998659313402e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.16139136498303e-2
```

x^{10}

```
n = 10 , left side = 6.20895791074231e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.37436652389465e-1
n = 20 , left side = 7.49326050835418e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.15329542103225e-1
```

```
n = 50 , left side = 9.67306970003267e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.37053936877325e-2
n = 100 , left side = 3.43473435582427e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94672436197673e-2
n = 200 , left side = 1.45410186988313e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43609607599862e-2
n = 500 , left side = 5.26675084446080e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28512327345197e-2


--------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96662765819202e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79859954914968e-1
n = 20 , left side = 1.37949642558639e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.09027838355715e-1
n = 50 , left side = 6.20456393446962e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.84681367232661e-2
n = 100 , left side = 3.21865168009463e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.65920653752551e-2
n = 200 , left side = 1.63902388375418e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.28673470632203e-2
n = 500 , left side = 6.62832648814309e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.22410675941500e-2
```

$$x$$

```
n = 10 , left side = 5.98756493877612e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.39650582109127e-1
n = 20 , left side = 3.15342098959860e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.12885927155931e-2
n = 50 , left side = 1.26185924322845e-2
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.20541082254513e-2
n = 100 , left side = 6.30929621654933e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.35014208388004e-2
n = 200 , left side = 3.15464810827466e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.13517228386998e-2
n = 500 , left side = 1.26185924330987e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.16420409996545e-2
```

x^2

```
n = 10 , left side = 9.22786128037476e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.07247618693140e-1
n = 20 , left side = 4.01698401778963e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.26529624336828e-2
n = 50 , left side = 1.40014633095062e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.06712373482296e-2
n = 100 , left side = 6.65501393596483e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.31557031193849e-2
n = 200 , left side = 3.24107753812854e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.12652934088460e-2
n = 500 , left side = 1.27568795208649e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.16282122908778e-2
```

x^3

```
n = 10 , left side = 9.79904495394282e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.01535781957460e-1
n = 20 , left side = 3.73549249176909e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.54678776938881e-2
n = 50 , left side = 1.15865818377543e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.30861188199815e-2
n = 100 , left side = 5.25659014127817e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.45541269140716e-2
n = 200 , left side = 2.49638540095468e-3
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20099855460198e-2
n = 500 , left side = 9.67185826845273e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19367144161190e-2
```

x^4

```
n = 10 , left side = 9.08480780580739e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.08678153438814e-1
n = 20 , left side = 3.04966491943750e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.23261534172040e-2
n = 50 , left side = 8.48735641559006e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.61853442421457e-2
n = 100 , left side = 3.68575070490398e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.61249663504458e-2
n = 200 , left side = 1.70850624998014e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27978646969944e-2
n = 500 , left side = 6.51770056364582e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.22521301865997e-2
```

x^{10}

```
n = 10 , left side = 3.53492597556091e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.64176971741279e-1
n = 20 , left side = 4.33489239958231e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.18487910211997e-1
n = 50 , left side = 5.62358290940473e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41103423667953e-2
n = 100 , left side = 1.91231443139256e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96194856122105e-2
n = 200 , left side = 7.76090693604399e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44287618776141e-2
n = 500 , left side = 2.71241857308545e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28767760572335e-2
```

```
-------------------------------------------------------------------------------
A = 3, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.51416822334619e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.84384549263426e-1
n = 20 , left side = 2.85210202437432e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19970700587205e-1
n = 50 , left side = 4.34807176805501e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.42378934809303e-2
n = 100 , left side = 1.08105548851654e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97026115064981e-2
n = 200 , left side = 2.69899968329530e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44793809501415e-2
n = 500 , left side = 4.31677870245360e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28995834642619e-2
```

$$x$$

```
n = 10 , left side = 1.78232033114016e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.97743911165748e-1
n = 20 , left side = 6.49176831929737e-6
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22816310843260e-1
n = 50 , left side = 4.17016503462199e-13
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006573187e-2
n = 100 , left side = 4.78248078723831e-25
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553497e-2
n = 200 , left side = 6.56476698581624e-49
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 1.75858371069954e-120
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 2.77130968204319e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.71813134676456e-1
n = 20 , left side = 7.63760747828129e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.15185195133298e-1
n = 50 , left side = 1.22364269385997e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.34490579638758e-2
n = 100 , left side = 3.05910673624321e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95048063817254e-2
n = 200 , left side = 7.64776684060802e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44298932785684e-2
n = 500 , left side = 1.22364269449728e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28916638160194e-2
```

x^3

```
n = 10 , left side = 4.21089274683114e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.57417304028577e-1
n = 20 , left side = 1.14590950673837e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11363707544195e-1
n = 50 , left side = 1.83546404098520e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.28372366167506e-2
n = 100 , left side = 4.58866010436481e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93518510449133e-2
n = 200 , left side = 1.14716502609120e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43916544443654e-2
n = 500 , left side = 1.83546404174592e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28855456025469e-2
```

x^4

```
n = 10 , left side = 4.48981405967206e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.54628090900167e-1
n = 20 , left side = 1.16876094450624e-2
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11135193166517e-1
n = 50 , left side = 1.84136113484672e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.28313395228890e-2
n = 100 , left side = 4.59234578807562e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93514824765422e-2
n = 200 , left side = 1.14739538132313e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43916314088422e-2
n = 500 , left side = 1.83552301268530e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28855450128375e-2
```

x^{10}

```
n = 10 , left side = 1.92191896311521e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.80307041865736e-1
n = 20 , left side = 2.29438013358182e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.20528422477997e-1
n = 50 , left side = 2.35272607344729e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.44374280503910e-2
n = 100 , left side = 5.49955285695450e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97557215267802e-2
n = 200 , left side = 1.35191249020858e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44928518220724e-2
n = 500 , left side = 2.15287022409081e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29017473727402e-2
```

8 Real-valued neural network approximation based on q-deformed and λ-parametrized A-generalized logistic function - part 2

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

As = [2.5, e, 3] #values for A, they all must be > 2


funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for A in As:
        ##########################################################
        for power in powers:      #going over various powers for 1/n^power
            ##########################################################
            for lamda in lamdas:  #going over each lamda value
            ##########################################################
                for q in qs:      #going over each q value
                ##########################################################
                    print()
                    print()
                   ␣
↪print("-------------------------------------------------------------------------------")
                    print("A = "+str(A) + ", Power = "+ str(power)+ ", lamda =␣
↪"+ str(lamda) + ",  q = " + str(q) )
                   ␣
↪print("-------------------------------------------------------------------------------")

                    #the activation function
                    phi(x) = 1/(1+q*(A^(-lamda*x)))   #formula 16.1

                    #q-deformed and λ-parametrized A-generalized logistic␣
↪function
                    G(x) = 1/2*(phi(x+1) - phi(x-1))    #formula 16.5

                    ##########################################################
                    for i in range(len(funcs)):
```

```
                    ##########################################################
                        f(x)=funcs[i]
                        show(f(x))
                        for n in [2000, 5000]:
                            #def L(n, f, x):    #real-valued linear neural␣
↪network operators
                            #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                            #leftSide = abs(L(n,f,x0)-f(x0))
                            leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in␣
↪[ceil(n*a),..,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)])-f(x0))
                            val1 = n
                            val2 = leftSide.n()
                            val3 = 1/(n^power).n()
                            print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 2.13079437783159e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00125723878526e-1
          n = 5000 , left side = 8.54438429645721e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.68255225419277e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 2.14841042286829e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00108107833489e-1
          n = 5000 , left side = 8.57257012604418e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.68227039589690e-2
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 1.06342222353062e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01193096032827e-1
n = 5000 , left side = 4.26903101764631e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72530578698088e-2
```

$$\cos(x)$$

```
n = 2000 , left side = 1.07618262558773e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01180335630770e-1
n = 5000 , left side = 4.28944776082130e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72510161954913e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 5.57092658104441e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02250947329776e-1
n = 5000 , left side = 8.91352369802867e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76790696192036e-2
```

$$\cos(x)$$

```
n = 2000 , left side = 5.57092658037828e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02250947329777e-1
n = 5000 , left side = 8.91352369580822e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76790696192038e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 1.06758459884537e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01188933657512e-1
n = 5000 , left side = 4.27568482669449e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72523924889039e-2
```

$\cos(x)$

```
n = 2000 , left side = 1.07203282611745e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01184485430240e-1
n = 5000 , left side = 4.28280200036379e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72516807715370e-2
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 2000 , left side = 5.33287355028556e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01723230901329e-1
n = 5000 , left side = 2.13703435471113e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74662575361023e-2
```

$\cos(x)$

```
n = 2000 , left side = 5.36521663552114e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01719996592805e-1
n = 5000 , left side = 2.14220925472741e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74657400461006e-2
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 2000 , left side = 1.41483443205637e-6
           1/n^(3/10) = 1.02256518256357e-1
```

```
                difference = 1.02255103421925e-1
          n = 5000 , left side = 2.26373772505006e-7
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76797345978009e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 1.41483443183432e-6
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02255103421925e-1
          n = 5000 , left side = 2.26373772616029e-7
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76797345978008e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 5.34327171096693e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01722191085261e-1
          n = 5000 , left side = 2.13869730533722e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.74660912410397e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 5.35483423453442e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01721034832904e-1
          n = 5000 , left side = 2.14054730976798e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.74659062405966e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 2.67026279996530e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01989491976361e-1
          n = 5000 , left side = 1.06912893962141e-4
```

```
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.75730480776112e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 2.67879052158082e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01988639204199e-1
          n = 5000 , left side = 1.07049337552678e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.75729116340207e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 3.75808099528641e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256142448258e-1
          n = 5000 , left side = 6.01290359725226e-8
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799008425374e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient
As = [2.5, e, 3] #values for A, they all must be > 2

funcs = [x^(1/3),x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for A in As:
    ##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
```

```
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
                ␣
↪print("-------------------------------------------------------------------------------")
                print("A = "+str(A) + ", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q) )
                ␣
↪print("-------------------------------------------------------------------------------")

                #the activation function
                phi(x) = 1/(1+q*(A^(-lamda*x)))   #formula 16.1

                #q-deformed and λ-parametrized A-generalized logistic function
                G(x) = 1/2*(phi(x+1) - phi(x-1))    #formula 16.5

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [2000, 5000]:
                        #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                        #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(L(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 1.59237440702601e-3
                    1/n^(3/10) = 1.02256518256357e-1
```

```
          difference = 1.00664143849331e-1
n = 5000 , left side = 6.39036830651391e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.70409241409220e-2
```

x

```
n = 2000 , left side = 3.02588318946462e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 9.92306350668927e-2
n = 5000 , left side = 1.21035327578589e-3
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.64696076957875e-2
```

x^2

```
n = 2000 , left side = 3.05079620502813e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 9.92057220513292e-2
n = 5000 , left side = 1.21433935827636e-3
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.64656216132970e-2
```

x^3

```
n = 2000 , left side = 2.30695265728323e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 9.99495655990741e-2
n = 5000 , left side = 9.13755008052325e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.67662059635211e-2
```

x^4

```
n = 2000 , left side = 1.55065459085782e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.00705863665499e-1
n = 5000 , left side = 6.11177667504667e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.70687833040687e-2
```

x^{10}

```
n = 2000 , left side = 6.36452837600066e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02192872972597e-1
n = 5000 , left side = 2.43508042334017e-5
          1/n^(3/10) = 7.76799609715734e-2
```

```
                    difference = 7.76556101673400e-2


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 7.94211251209405e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01462307005148e-1
          n = 5000 , left side = 3.19202672822736e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.73607582987507e-2
```

$$x$$

```
          n = 2000 , left side = 1.51294159473181e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00743576661626e-1
          n = 5000 , left side = 6.05176637892613e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.70747843336808e-2
```

$$x^2$$

```
          n = 2000 , left side = 1.53098763348869e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.00725530622869e-1
          n = 5000 , left side = 6.08064004094244e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.70718969674791e-2
```

$$x^3$$

```
          n = 2000 , left side = 1.16185023576890e-3
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01094668020588e-1
          n = 5000 , left side = 4.58218326542803e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.72217426450306e-2
```

$$x^4$$

```
          n = 2000 , left side = 7.83691079960167e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01472827176397e-1
```

```
n = 5000 , left side = 3.06928998179884e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.73730319733935e-2
```

$$x^{10}$$

```
n = 2000 , left side = 3.27962984511361e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02223721957906e-1
n = 5000 , left side = 1.23320065814824e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76676289649919e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 5.55893287466904e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02250959323483e-1
n = 5000 , left side = 8.89356209020041e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76790716153644e-2
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256518256357e-1
n = 5000 , left side = 1.66533453693773e-16
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799609715732e-2
```

$$x^2$$

```
n = 2000 , left side = 1.57570464878187e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02240761209869e-1
n = 5000 , left side = 2.52112743787114e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76774398441355e-2
```

$$x^3$$

```
n = 2000 , left side = 2.36355697315060e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02232882686626e-1
n = 5000 , left side = 3.78169115713978e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76761792804162e-2
```

$$x^4$$

```
n = 2000 , left side = 2.36366093750440e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02232881646982e-1
n = 5000 , left side = 3.78171777186409e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76761792538015e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.77320669003008e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02253745049667e-1
n = 5000 , left side = 4.43254270843891e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76795177173025e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.98337670615906e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01458180585741e-1
n = 5000 , left side = 3.19864828701911e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.73600961428715e-2
```

$$x$$

```
n = 2000 , left side = 1.51294159473181e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.00743576661626e-1
n = 5000 , left side = 6.05176637893168e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.70747843336802e-2
```

$$x^2$$

```
n = 2000 , left side = 1.51923234862300e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.00737285907734e-1
n = 5000 , left side = 6.06183158515294e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.70737778130581e-2
```

$$x^3$$

```
n = 2000 , left side = 1.14416395329195e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01112354303065e-1
n = 5000 , left side = 4.55393643443491e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72245673281299e-2
```

$$x^4$$

```
n = 2000 , left side = 7.65950307673693e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01490567948684e-1
n = 5000 , left side = 3.04100871302740e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.73758601002706e-2
```

$$x^{10}$$

```
n = 2000 , left side = 3.06761326384296e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02225842123719e-1
n = 5000 , left side = 1.19980919383459e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76679628796350e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.98664358792405e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01857853897565e-1
n = 5000 , left side = 1.59851748187278e-4
```

```
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75201092233861e-2
```

x

```
n = 2000 , left side = 7.56470797365849e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01500047458991e-1
n = 5000 , left side = 3.02588318946473e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.73773726526269e-2
```

x^2

```
n = 2000 , left side = 7.61044807055022e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01495473449302e-1
n = 5000 , left side = 3.03320160496334e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.73766408110770e-2
```

x^3

```
n = 2000 , left side = 5.74223627094611e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01682294629263e-1
n = 5000 , left side = 2.28039610465441e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74519213611079e-2
```

x^4

```
n = 2000 , left side = 3.85115522815838e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01871402733541e-1
n = 5000 , left side = 1.52393141720789e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75275678298526e-2
```

x^{10}

```
n = 2000 , left side = 1.55880316649877e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02240930224692e-1
n = 5000 , left side = 6.03914978517602e-6
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76739218217882e-2
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.41167931356124e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255106577044e-1
n = 5000 , left side = 2.25864021370996e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797351075520e-2
```

$$x$$

```
n = 2000 , left side = 1.11022302462516e-16
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256518256357e-1
n = 5000 , left side = 2.22044604925031e-16
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799609715732e-2
```

$$x^2$$

```
n = 2000 , left side = 4.00176162201893e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02252516494735e-1
n = 5000 , left side = 6.40281859976000e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76793206897134e-2
```

$$x^3$$

```
n = 2000 , left side = 6.00264243297288e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02250515613924e-1
n = 5000 , left side = 9.60422789353377e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76790005487840e-2
```

$$x^4$$

```
n = 2000 , left side = 6.00270889174193e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02250515547466e-1
n = 5000 , left side = 9.60424490589751e-7
```

```
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76790005470828e-2
```

$$x^{10}$$

```
      n = 2000 , left side = 7.03652760751169e-7
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02255814603597e-1
      n = 5000 , left side = 1.12555128293189e-7
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76798484164451e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
      n = 2000 , left side = 3.99698468238513e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01856819788119e-1
      n = 5000 , left side = 1.60017451589124e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.75199435199843e-2
```

$$x$$

```
      n = 2000 , left side = 7.56470797120712e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01500047459237e-1
      n = 5000 , left side = 3.02588318848329e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.73773726527251e-2
```

$$x^2$$

```
      n = 2000 , left side = 7.58105985582569e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01498412270775e-1
      n = 5000 , left side = 3.02849949002260e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.73771110225711e-2
```

$$x^3$$

```
      n = 2000 , left side = 5.69808725672499e-4
                1/n^(3/10) = 1.02256518256357e-1
```

```
          difference = 1.01686709530685e-1
n = 5000 , left side = 2.27333866455875e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74526271051175e-2
```

$$x^4$$

```
n = 2000 , left side = 3.80693880041250e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01875824376316e-1
n = 5000 , left side = 1.51686969050602e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75282740025228e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.50649511431349e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02241453305214e-1
n = 5000 , left side = 5.95608920294526e-6
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76740048823704e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.99712155087978e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02056806101269e-1
n = 5000 , left side = 7.99867989751687e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75999741725982e-2
```

$$x$$

```
n = 2000 , left side = 3.78235395663284e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01878282860694e-1
n = 5000 , left side = 1.51294158265203e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75286668133082e-2
```

$$x^2$$

```
n = 2000 , left side = 3.79441398083713e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01877076858274e-1
n = 5000 , left side = 1.51487118652538e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75284738529208e-2
```

x^3

```
n = 2000 , left side = 2.85486810614272e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01971031445743e-1
n = 5000 , left side = 1.13760139934860e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75662008316385e-2
```

x^4

```
n = 2000 , left side = 1.90929227400216e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02065589028957e-1
n = 5000 , left side = 7.59366811637074e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76040242904097e-2
```

x^{10}

```
n = 2000 , left side = 7.60060216279681e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02248917654195e-1
n = 5000 , left side = 2.98895892071843e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76769720126527e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$x^{\frac{1}{3}}$

```
n = 2000 , left side = 3.74960754700060e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256143295603e-1
n = 5000 , left side = 5.99934027956820e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799009781706e-2
```

x

```
n = 2000 , left side = 3.33066907387547e-16
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256518256357e-1
n = 5000 , left side = 2.77555756156289e-16
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799609715731e-2
```

x^2

```
n = 2000 , left side = 1.06294041574140e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255455315942e-1
n = 5000 , left side = 1.70070466432026e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797909011070e-2
```

x^3

```
n = 2000 , left side = 1.59441062372312e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02254923845734e-1
n = 5000 , left side = 2.55105699731306e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797058658737e-2
```

x^4

```
n = 2000 , left side = 1.59441515650005e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02254923841201e-1
n = 5000 , left side = 2.55105815832879e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797058657576e-2
```

x^{10}

```
n = 2000 , left side = 1.86859868616740e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256331396489e-1
n = 5000 , left side = 2.98955799484402e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799310759934e-2
```

```
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.59237440702601e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.07683053679719e-2
n = 5000 , left side = 6.39036830651391e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35030987930796e-2
```

$$x$$

```
n = 2000 , left side = 3.02588318946462e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 1.93347965855333e-2
n = 5000 , left side = 1.21035327578589e-3
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.29317823479451e-2
```

$$x^2$$

```
n = 2000 , left side = 3.05079620502813e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 1.93098835699698e-2
n = 5000 , left side = 1.21433935827636e-3
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.29277962654546e-2
```

$$x^3$$

```
n = 2000 , left side = 2.30695265728323e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.00537271177147e-2
n = 5000 , left side = 9.13755008052325e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.32283806156786e-2
```

$$x^4$$

```
n = 2000 , left side = 1.55065459085782e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.08100251841401e-2
n = 5000 , left side = 6.11177667504667e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35309579562263e-2
```

$$x^{10}$$

```
n = 2000 , left side = 6.36452837600066e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.22970344912379e-2
n = 5000 , left side = 2.43508042334017e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41177848194975e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.94211251209405e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.15664685237885e-2
n = 5000 , left side = 3.19202672822736e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38229329509082e-2
```

$$x$$

```
n = 2000 , left side = 1.51294159473181e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.08477381802661e-2
n = 5000 , left side = 6.05176637892613e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35369589858383e-2
```

$$x^2$$

```
n = 2000 , left side = 1.53098763348869e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.08296921415092e-2
n = 5000 , left side = 6.08064004094244e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35340716196367e-2
```

$$x^3$$

```
n = 2000 , left side = 1.16185023576890e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.11988295392290e-2
n = 5000 , left side = 4.58218326542803e-4
```

```
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.36839172971881e-2
```

$$x^4$$

```
n = 2000 , left side = 7.83691079960167e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.15769886950377e-2
n = 5000 , left side = 3.06928998179884e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38352066255511e-2
```

$$x^{10}$$

```
n = 2000 , left side = 3.27962984511361e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23278834765468e-2
n = 5000 , left side = 1.23320065814824e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41298036171495e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 5.55893287466904e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23551208421232e-2
n = 5000 , left side = 8.89356209020041e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41412462675219e-2
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23606797749979e-2
n = 5000 , left side = 1.66533453693773e-16
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41421356237308e-2
```

$$x^2$$

```
n = 2000 , left side = 1.57570464878187e-5
          1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.23449227285101e-2
n = 5000 , left side = 2.52112743787114e-6
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41396144962931e-2
```

$$x^3$$

```
n = 2000 , left side = 2.36355697315060e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23370442052664e-2
n = 5000 , left side = 3.78169115713978e-6
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41383539325738e-2
```

$$x^4$$

```
n = 2000 , left side = 2.36366093750440e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23370431656229e-2
n = 5000 , left side = 3.78171777186409e-6
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41383539059591e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.77320669003008e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23579065683079e-2
n = 5000 , left side = 4.43254270843891e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41416923694601e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.98337670615906e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.15623421043820e-2
n = 5000 , left side = 3.19864828701911e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38222707950290e-2
```

$$x$$

```
n = 2000 , left side = 1.51294159473181e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.08477381802661e-2
n = 5000 , left side = 6.05176637893168e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35369589858378e-2
```

x^2

```
n = 2000 , left side = 1.51923234862300e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.08414474263749e-2
n = 5000 , left side = 6.06183158515294e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35359524652157e-2
```

x^3

```
n = 2000 , left side = 1.14416395329195e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.12165158217059e-2
n = 5000 , left side = 4.55393643443491e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.36867419802875e-2
```

x^4

```
n = 2000 , left side = 7.65950307673693e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.15947294673242e-2
n = 5000 , left side = 3.04100871302740e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38380347524282e-2
```

x^{10}

```
n = 2000 , left side = 3.06761326384296e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23300036423595e-2
n = 5000 , left side = 1.19980919383459e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41301375317926e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.98664358792405e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.19620154162055e-2
n = 5000 , left side = 1.59851748187278e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39822838755437e-2
```

$$x$$

```
n = 2000 , left side = 7.56470797365849e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16042089776320e-2
n = 5000 , left side = 3.02588318946473e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38395473047845e-2
```

$$x^2$$

```
n = 2000 , left side = 7.61044807055022e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.15996349679429e-2
n = 5000 , left side = 3.03320160496334e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38388154632346e-2
```

$$x^3$$

```
n = 2000 , left side = 5.74223627094611e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.17864561479033e-2
n = 5000 , left side = 2.28039610465441e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39140960132655e-2
```

$$x^4$$

```
n = 2000 , left side = 3.85115522815838e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.19755642521821e-2
n = 5000 , left side = 1.52393141720789e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39897424820102e-2
```

$$x^{10}$$

```
          n = 2000 , left side = 1.55880316649877e-5
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.23450917433329e-2
          n = 5000 , left side = 6.03914978517602e-6
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.41360964739458e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 1.41167931356124e-6
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.23592680956843e-2
          n = 5000 , left side = 2.25864021370996e-7
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.41419097597096e-2
```

$$x$$

```
          n = 2000 , left side = 1.11022302462516e-16
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.23606797749978e-2
          n = 5000 , left side = 2.22044604925031e-16
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.41421356237307e-2
```

$$x^2$$

```
          n = 2000 , left side = 4.00176162201893e-6
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.23566780133759e-2
          n = 5000 , left side = 6.40281859976000e-7
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.41414953418710e-2
```

$$x^3$$

```
          n = 2000 , left side = 6.00264243297288e-6
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.23546771325649e-2
          n = 5000 , left side = 9.60422789353377e-7
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.41411752009416e-2
```

$$x^4$$

```
n = 2000 , left side = 6.00270889174193e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23546770661062e-2
n = 5000 , left side = 9.60424490589751e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41411751992404e-2
```

$$x^{10}$$

```
n = 2000 , left side = 7.03652760751169e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23599761222371e-2
n = 5000 , left side = 1.12555128293189e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420230686027e-2
```

A = 2.50000000000000e0, Power = 1/2, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.99698468238513e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.19609813067594e-2
n = 5000 , left side = 1.60017451589124e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39821181721418e-2
```

$$x$$

```
n = 2000 , left side = 7.56470797120712e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16042089778772e-2
n = 5000 , left side = 3.02588318848329e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38395473048826e-2
```

$$x^2$$

```
n = 2000 , left side = 7.58105985582569e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16025737894153e-2
n = 5000 , left side = 3.02849949002260e-4
```

```
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38392856747287e-2
```

$$x^3$$

```
n = 2000 , left side = 5.69808725672499e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.17908710493254e-2
n = 5000 , left side = 2.27333866455875e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39148017572751e-2
```

$$x^4$$

```
n = 2000 , left side = 3.80693880041250e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.19799858949566e-2
n = 5000 , left side = 1.51686969050602e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39904486546803e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.50649511431349e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23456148238548e-2
n = 5000 , left side = 5.95608920294526e-6
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41361795345280e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.99712155087978e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.21609676199099e-2
n = 5000 , left side = 7.99867989751687e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40621488247558e-2
```

$$x$$

```
n = 2000 , left side = 3.78235395663284e-4
          1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.19824443793346e-2
n = 5000 , left side = 1.51294158265203e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39908414654657e-2
```

$$x^2$$

```
n = 2000 , left side = 3.79441398083713e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.19812383769142e-2
n = 5000 , left side = 1.51487118652538e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39906485050784e-2
```

$$x^3$$

```
n = 2000 , left side = 2.85486810614272e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.20751929643836e-2
n = 5000 , left side = 1.13760139934860e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40283754837961e-2
```

$$x^4$$

```
n = 2000 , left side = 1.90929227400216e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.21697505475977e-2
n = 5000 , left side = 7.59366811637074e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40661989425672e-2
```

$$x^{10}$$

```
n = 2000 , left side = 7.60060216279681e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23530791728351e-2
n = 5000 , left side = 2.98895892071843e-6
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41391466648102e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.74960754700060e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23603048142432e-2
n = 5000 , left side = 5.99934027956820e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420756303282e-2
```

x

```
n = 2000 , left side = 3.33066907387547e-16
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749976e-2
n = 5000 , left side = 2.77555756156289e-16
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421356237307e-2
```

x^2

```
n = 2000 , left side = 1.06294041574140e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23596168345822e-2
n = 5000 , left side = 1.70070466432026e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41419655532645e-2
```

x^3

```
n = 2000 , left side = 1.59441062372312e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23590853643742e-2
n = 5000 , left side = 2.55105699731306e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41418805180312e-2
```

x^4

```
n = 2000 , left side = 1.59441515650005e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23590853598414e-2
n = 5000 , left side = 2.55105815832879e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41418805179151e-2
```

x^{10}

```
n = 2000 , left side = 1.86859868616740e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23604929151293e-2
```

```
          n = 5000 , left side = 2.98955799484402e-8
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.41421057281510e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$x^{\frac{1}{3}}$

```
          n = 2000 , left side = 1.59237440702601e-3
                     1/n^(7/10) = 4.88966384271464e-3
                     difference = 3.29728943568864e-3
          n = 5000 , left side = 6.39036830651391e-4
                     1/n^(7/10) = 2.57466658709045e-3
                     difference = 1.93562975643906e-3
```

x

```
          n = 2000 , left side = 3.02588318946462e-3
                     1/n^(7/10) = 4.88966384271464e-3
                     difference = 1.86378065325003e-3
          n = 5000 , left side = 1.21035327578589e-3
                     1/n^(7/10) = 2.57466658709045e-3
                     difference = 1.36431331130456e-3
```

x^2

```
          n = 2000 , left side = 3.05079620502813e-3
                     1/n^(7/10) = 4.88966384271464e-3
                     difference = 1.83886763768652e-3
          n = 5000 , left side = 1.21433935827636e-3
                     1/n^(7/10) = 2.57466658709045e-3
                     difference = 1.36032722881409e-3
```

x^3

```
          n = 2000 , left side = 2.30695265728323e-3
                     1/n^(7/10) = 4.88966384271464e-3
                     difference = 2.58271118543142e-3
          n = 5000 , left side = 9.13755008052325e-4
                     1/n^(7/10) = 2.57466658709045e-3
                     difference = 1.66091157903812e-3
```

x^4

```
n = 2000 , left side = 1.55065459085782e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.33900925185682e-3
n = 5000 , left side = 6.11177667504667e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.96348891958578e-3
```

$$x^{10}$$

```
n = 2000 , left side = 6.36452837600066e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.82601855895464e-3
n = 5000 , left side = 2.43508042334017e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.55031578285705e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.94211251209405e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.09545259150524e-3
n = 5000 , left side = 3.19202672822736e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.25546391426771e-3
```

$$x$$

```
n = 2000 , left side = 1.51294159473181e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.37672224798284e-3
n = 5000 , left side = 6.05176637892613e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.96948994919784e-3
```

$$x^2$$

```
n = 2000 , left side = 1.53098763348869e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.35867620922595e-3
n = 5000 , left side = 6.08064004094244e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.96660258299620e-3
```

$$x^3$$

```
n = 2000 , left side = 1.16185023576890e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.72781360694575e-3
n = 5000 , left side = 4.58218326542803e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.11644826054765e-3
```

$$x^4$$

```
n = 2000 , left side = 7.83691079960167e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.10597276275448e-3
n = 5000 , left side = 3.06928998179884e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.26773758891056e-3
```

$$x^{10}$$

```
n = 2000 , left side = 3.27962984511361e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.85686754426351e-3
n = 5000 , left side = 1.23320065814824e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.56233458050897e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 5.55893287466904e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88410490983998e-3
n = 5000 , left side = 8.89356209020041e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57377723088143e-3
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271464e-3
n = 5000 , left side = 1.66533453693773e-16
```

```
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57466658709028e-3
```

$$x^2$$

```
n = 2000 , left side = 1.57570464878187e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.87390679622683e-3
n = 5000 , left side = 2.52112743787114e-6
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57214545965258e-3
```

$$x^3$$

```
n = 2000 , left side = 2.36355697315060e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.86602827298314e-3
n = 5000 , left side = 3.78169115713978e-6
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57088489593331e-3
```

$$x^4$$

```
n = 2000 , left side = 2.36366093750440e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.86602723333960e-3
n = 5000 , left side = 3.78171777186409e-6
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57088486931858e-3
```

$$x^{10}$$

```
n = 2000 , left side = 2.77320669003008e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88689063602461e-3
n = 5000 , left side = 4.43254270843891e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57422333281960e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.98337670615906e-4
          1/n^(7/10) = 4.88966384271464e-3
```

```
          difference = 4.09132617209874e-3
n = 5000 , left side = 3.19864828701911e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.25480175838854e-3
```

x

```
n = 2000 , left side = 1.51294159473181e-3
          1/n^(7/10) = 4.88966384271464e-3
          difference = 3.37672224798284e-3
n = 5000 , left side = 6.05176637893168e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 1.96948994919728e-3
```

x^2

```
n = 2000 , left side = 1.51923234862300e-3
          1/n^(7/10) = 4.88966384271464e-3
          difference = 3.37043149409164e-3
n = 5000 , left side = 6.06183158515294e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 1.96848342857515e-3
```

x^3

```
n = 2000 , left side = 1.14416395329195e-3
          1/n^(7/10) = 4.88966384271464e-3
          difference = 3.74549988942270e-3
n = 5000 , left side = 4.55393643443491e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.11927294364696e-3
```

x^4

```
n = 2000 , left side = 7.65950307673693e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.12371353504095e-3
n = 5000 , left side = 3.04100871302740e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.27056571578771e-3
```

x^{10}

```
n = 2000 , left side = 3.06761326384296e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.85898771007622e-3
n = 5000 , left side = 1.19980919383459e-5
          1/n^(7/10) = 2.57466658709045e-3
```

```
                    difference = 2.56266849515210e-3


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 3.98664358792405e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.49099948392224e-3
          n = 5000 , left side = 1.59851748187278e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.41481483890317e-3
```

$$x$$

```
          n = 2000 , left side = 7.56470797365849e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.13319304534880e-3
          n = 5000 , left side = 3.02588318946473e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.27207826814398e-3
```

$$x^2$$

```
          n = 2000 , left side = 7.61044807055022e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.12861903565962e-3
          n = 5000 , left side = 3.03320160496334e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.27134642659411e-3
```

$$x^3$$

```
          n = 2000 , left side = 5.74223627094611e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.31544021562003e-3
          n = 5000 , left side = 2.28039610465441e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.34662697662501e-3
```

$$x^4$$

```
          n = 2000 , left side = 3.85115522815838e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.50454831989881e-3
```

```
n = 5000 , left side = 1.52393141720789e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.42227344536966e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.55880316649877e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.87407581104966e-3
n = 5000 , left side = 6.03914978517602e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.56862743730527e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.41167931356124e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88825216340108e-3
n = 5000 , left side = 2.25864021370996e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57444072306908e-3
```

$$x$$

```
n = 2000 , left side = 1.11022302462516e-16
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271453e-3
n = 5000 , left side = 2.22044604925031e-16
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57466658709023e-3
```

$$x^2$$

```
n = 2000 , left side = 4.00176162201893e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88566208109263e-3
n = 5000 , left side = 6.40281859976000e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57402630523047e-3
```

$$x^3$$

```
n = 2000 , left side = 6.00264243297288e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88366120028167e-3
n = 5000 , left side = 9.60422789353377e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57370616430110e-3
```

$$x^4$$

```
n = 2000 , left side = 6.00270889174193e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88366113382290e-3
n = 5000 , left side = 9.60424490589751e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57370616259986e-3
```

$$x^{10}$$

```
n = 2000 , left side = 7.03652760751169e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88896018995389e-3
n = 5000 , left side = 1.12555128293189e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57455403196216e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.99698468238513e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.48996537447613e-3
n = 5000 , left side = 1.60017451589124e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.41464913550132e-3
```

$$x$$

```
n = 2000 , left side = 7.56470797120712e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.13319304559393e-3
n = 5000 , left side = 3.02588318848329e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.27207826824212e-3
```

$$x^2$$

```
n = 2000 , left side = 7.58105985582569e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.13155785713208e-3
n = 5000 , left side = 3.02849949002260e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.27181663808819e-3
```

$$x^3$$

```
n = 2000 , left side = 5.69808725672499e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.31985511704215e-3
n = 5000 , left side = 2.27333866455875e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.34733272063457e-3
```

$$x^4$$

```
n = 2000 , left side = 3.80693880041250e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.50896996267339e-3
n = 5000 , left side = 1.51686969050602e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.42297961803985e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.50649511431349e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.87459889157151e-3
n = 5000 , left side = 5.95608920294526e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.56871049788750e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.99712155087978e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.68995168762667e-3
n = 5000 , left side = 7.99867989751687e-5
```

```
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.49467978811528e-3
```

x

```
n = 2000 , left side = 3.78235395663284e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.51142844705136e-3
n = 5000 , left side = 1.51294158265203e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.42337242882525e-3
```

x^2

```
n = 2000 , left side = 3.79441398083713e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.51022244463093e-3
n = 5000 , left side = 1.51487118652538e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.42317946843791e-3
```

x^3

```
n = 2000 , left side = 2.85486810614272e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.60417703210037e-3
n = 5000 , left side = 1.13760139934860e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.46090644715559e-3
```

x^4

```
n = 2000 , left side = 1.90929227400216e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.69873461531443e-3
n = 5000 , left side = 7.59366811637074e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.49872990592674e-3
```

x^{10}

```
n = 2000 , left side = 7.60060216279681e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88206324055185e-3
n = 5000 , left side = 2.98895892071843e-6
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57167762816973e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.74960754700060e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88928888195994e-3
n = 5000 , left side = 5.99934027956820e-8
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57460659368765e-3
```

$$x$$

```
n = 2000 , left side = 3.33066907387547e-16
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271431e-3
n = 5000 , left side = 2.77555756156289e-16
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57466658709017e-3
```

$$x^2$$

```
n = 2000 , left side = 1.06294041574140e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88860090229890e-3
n = 5000 , left side = 1.70070466432026e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57449651662402e-3
```

$$x^3$$

```
n = 2000 , left side = 1.59441062372312e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88806943209092e-3
n = 5000 , left side = 2.55105699731306e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57441148139072e-3
```

$$x^4$$

```
n = 2000 , left side = 1.59441515650005e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88806942755814e-3
n = 5000 , left side = 2.55105815832879e-7
```

```
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57441148127462e-3
```

$$x^{10}$$

```
        n = 2000 , left side = 1.86859868616740e-7
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.88947698284603e-3
        n = 5000 , left side = 2.98955799484402e-8
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57463669151050e-3


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 2000 , left side = 1.45973769075347e-3
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.00796780565604e-1
        n = 5000 , left side = 5.85650001354243e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.70943109702191e-2
```

$$x$$

```
        n = 2000 , left side = 2.77258872224018e-3
                1/n^(3/10) = 1.02256518256357e-1
                difference = 9.94839295341171e-2
        n = 5000 , left side = 1.10903548889596e-3
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.65709254826774e-2
```

$$x^2$$

```
        n = 2000 , left side = 2.79351877633061e-3
                1/n^(3/10) = 1.02256518256357e-1
                difference = 9.94629994800267e-2
        n = 5000 , left side = 1.11238429755023e-3
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.65675766740232e-2
```

$$x^3$$

```
        n = 2000 , left side = 2.11096808695641e-3
                1/n^(3/10) = 1.02256518256357e-1
```

```
          difference = 1.00145550169401e-1
n = 5000 , left side = 8.36808243358689e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.68431527282147e-2
```

$$x^4$$

```
n = 2000 , left side = 1.41795377434827e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.00838564482009e-1
n = 5000 , left side = 5.59557820777268e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.71204031507961e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.79591945911288e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02198559061766e-1
n = 5000 , left side = 2.22575140039899e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76577034575694e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.28207805430370e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01528310450927e-1
n = 5000 , left side = 2.92559548393023e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.73874014231804e-2
```

$$x$$

```
n = 2000 , left side = 1.38629436111992e-3
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.00870223895237e-1
n = 5000 , left side = 5.54517744447813e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.71254432271256e-2
```

$$x^2$$

```
n = 2000 , left side = 1.40145897904370e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.00855059277314e-1
n = 5000 , left side = 5.56944083315858e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.71230168882575e-2
```

$$x^3$$

```
n = 2000 , left side = 1.06252543720411e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01193992819153e-1
n = 5000 , left side = 4.19531511964277e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72604294596091e-2
```

$$x^4$$

```
n = 2000 , left side = 7.16010476710618e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01540507779647e-1
n = 5000 , left side = 2.80905793970818e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.73990551776026e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.97988137042474e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02226719442653e-1
n = 5000 , left side = 1.12604691742690e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76687005023991e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 4.67186009045495e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02251846396267e-1
n = 5000 , left side = 7.47446048721123e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76792135255247e-2
```

x

```
n = 2000 , left side = 3.33066907387547e-16
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256518256357e-1
n = 5000 , left side = 0.000000000000000e0
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799609715734e-2
```

x^2

```
n = 2000 , left side = 1.32428058681189e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02243275450489e-1
n = 5000 , left side = 2.11884893891456e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76778421226345e-2
```

x^3

```
n = 2000 , left side = 1.98642088024559e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02236654047555e-1
n = 5000 , left side = 3.17827340814980e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76767826981652e-2
```

x^4

```
n = 2000 , left side = 1.98649427156916e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02236653313642e-1
n = 5000 , left side = 3.17829219655119e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76767826793768e-2
```

x^{10}

```
n = 2000 , left side = 2.33024632692092e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02254188010030e-1
n = 5000 , left side = 3.72515569103038e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76795884560043e-2
```

```
A = e, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.31673691974022e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01524844564383e-1
n = 5000 , left side = 2.93115579032333e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.73868453925411e-2
```

$$x$$

```
n = 2000 , left side = 1.38629436111992e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.00870223895237e-1
n = 5000 , left side = 5.54517744448146e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.71254432271252e-2
```

$$x^2$$

```
n = 2000 , left side = 1.39158937464251e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.00864928881715e-1
n = 5000 , left side = 5.55364946611681e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.71245960249617e-2
```

$$x^3$$

```
n = 2000 , left side = 1.04767998407165e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01208838272286e-1
n = 5000 , left side = 4.17160179930043e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72628007916433e-2
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443774e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01555395079914e-1
n = 5000 , left side = 2.78531814463148e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74014291571102e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.80227731776685e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02228495483180e-1
n = 5000 , left side = 1.09803560975803e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76689806154758e-2
```

A = e, Power = 3/10, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.65410972395064e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01891107283962e-1
n = 5000 , left side = 1.46489688195639e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75334712833777e-2
```

$$x$$

```
n = 2000 , left side = 6.93147180559905e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01563371075797e-1
n = 5000 , left side = 2.77258872224295e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74027020993491e-2
```

$$x^2$$

```
n = 2000 , left side = 6.97000835040928e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01559517421316e-1
n = 5000 , left side = 2.77875456940857e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74020855146325e-2
```

$$x^3$$

```
n = 2000 , left side = 5.25648214541319e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01730870041816e-1
n = 5000 , left side = 2.08869501476971e-4
```

```
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.74710914700964e-2
```

$$x^4$$

```
      n = 2000 , left side = 3.52368823871060e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01904149432486e-1
      n = 5000 , left side = 1.39555255115623e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.75404057164578e-2
```

$$x^{10}$$

```
      n = 2000 , left side = 1.42225079191021e-5
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02242295748438e-1
      n = 5000 , left side = 5.52404203211848e-6
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76744369295413e-2


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
      n = 2000 , left side = 1.18994097031422e-6
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02255328315387e-1
      n = 5000 , left side = 1.90387246079560e-7
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76797705843273e-2
```

$$x$$

```
      n = 2000 , left side = 1.11022302462516e-16
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02256518256357e-1
      n = 5000 , left side = 2.22044604925031e-16
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76799609715732e-2
```

$$x^2$$

```
      n = 2000 , left side = 3.37320146698294e-6
                1/n^(3/10) = 1.02256518256357e-1
```

```
          difference = 1.02253145054890e-1
n = 5000 , left side = 5.39712234737255e-7
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76794212593386e-2
```

$$x^3$$

```
n = 2000 , left side = 5.05980220052993e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02251458454157e-1
n = 5000 , left side = 8.09568352050372e-7
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76791514032213e-2
```

$$x^4$$

```
n = 2000 , left side = 5.05984931557790e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02251458407042e-1
n = 5000 , left side = 8.09569558196666e-7
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76791514020152e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.93100186507866e-7
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02255925156171e-1
n = 5000 , left side = 9.48752488783271e-8
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76798660963245e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383738344e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01890238872619e-1
n = 5000 , left side = 1.46628824907125e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75333321466663e-2
```

$$x$$

```
n = 2000 , left side = 6.93147191573207e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01563371064784e-1
n = 5000 , left side = 2.77258876629438e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74027020949439e-2
```

$$x^2$$

```
n = 2000 , left side = 6.94533444929257e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01561984811428e-1
n = 5000 , left side = 2.77480677166209e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74024802944072e-2
```

$$x^3$$

```
n = 2000 , left side = 5.21941990297453e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01734576266060e-1
n = 5000 , left side = 2.08277000138729e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74716839714347e-2
```

$$x^4$$

```
n = 2000 , left side = 3.48657415094336e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01907860841263e-1
n = 5000 , left side = 1.38962422999087e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75409985485743e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.37838066333505e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02242734449724e-1
n = 5000 , left side = 5.45433431874500e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76745066372546e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83022238703923e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02073496017653e-1
n = 5000 , left side = 7.32956220088621e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76066653495645e-2
```

$$x$$

```
n = 2000 , left side = 3.46573574531717e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01909944681826e-1
n = 5000 , left side = 1.38629429812909e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75413315417605e-2
```

$$x^2$$

```
n = 2000 , left side = 3.47599488122574e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01908918768235e-1
n = 5000 , left side = 1.38793575987228e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75411673955862e-2
```

$$x^3$$

```
n = 2000 , left side = 2.61470034692818e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01995048221664e-1
n = 5000 , left side = 1.04218354559454e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75757426170139e-2
```

$$x^4$$

```
n = 2000 , left side = 1.74827628399502e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02081690627958e-1
n = 5000 , left side = 6.95610601450236e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76103999114284e-2
```

$$x^{10}$$

```
          n = 2000 , left side = 6.95028639577117e-6
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02249567969962e-1
          n = 5000 , left side = 2.73651920645272e-6
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76772244523669e-2


--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 3.19528048575712e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256198728309e-1
          n = 5000 , left side = 5.11242583822735e-8
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799098473150e-2
```

$$x$$

```
          n = 2000 , left side = 1.11022302462516e-16
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256518256357e-1
          n = 5000 , left side = 2.22044604925031e-16
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799609715732e-2
```

$$x^2$$

```
          n = 2000 , left side = 9.05800419559455e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02255612455938e-1
          n = 5000 , left side = 1.44928067158379e-7
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76798160435062e-2
```

$$x^3$$

```
          n = 2000 , left side = 1.35870062942245e-6
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02255159555728e-1
          n = 5000 , left side = 2.17392100654301e-7
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76797435794727e-2
```

$$x^4$$

```
n = 2000 , left side = 1.35870389421366e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255159552463e-1
n = 5000 , left side = 2.17392184295728e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797435793891e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.59233443428877e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256359022914e-1
n = 5000 , left side = 2.54759108162493e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799354956626e-2
```

A = e, Power = 1/2, lamda = 1/4, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.45973769075347e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.09009420842444e-2
n = 5000 , left side = 5.85650001354243e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35564856223767e-2
```

$$x$$

```
n = 2000 , left side = 2.77258872224018e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 1.95880910527577e-2
n = 5000 , left side = 1.10903548889596e-3
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.30331001348350e-2
```

$$x^2$$

```
n = 2000 , left side = 2.79351877633061e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 1.95671609986673e-2
n = 5000 , left side = 1.11238429755023e-3
```

```
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.30297513261807e-2
```

$$x^3$$

```
n = 2000 , left side = 2.11096808695641e-3
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.02497116880415e-2
n = 5000 , left side = 8.36808243358689e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.33053273803723e-2
```

$$x^4$$

```
n = 2000 , left side = 1.41795377434827e-3
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.09427260006496e-2
n = 5000 , left side = 5.59557820777268e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.35825778029537e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.79591945911288e-5
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23027205804068e-2
n = 5000 , left side = 2.22575140039899e-5
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41198781097270e-2
```

A = e, Power = 1/2, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.28207805430370e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.16324719695675e-2
n = 5000 , left side = 2.92559548393023e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.38495760753379e-2
```

$$x$$

```
n = 2000 , left side = 1.38629436111992e-3
                1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.09743854138780e-2
n = 5000 , left side = 5.54517744447813e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.35876178792831e-2
```

$$x^2$$

```
n = 2000 , left side = 1.40145897904370e-3
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.09592207959542e-2
n = 5000 , left side = 5.56944083315858e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.35851915404151e-2
```

$$x^3$$

```
n = 2000 , left side = 1.06252543720411e-3
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.12981543377938e-2
n = 5000 , left side = 4.19531511964277e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.37226041117667e-2
```

$$x^4$$

```
n = 2000 , left side = 7.16010476710618e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.16446692982873e-2
n = 5000 , left side = 2.80905793970818e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38612298297601e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.97988137042474e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23308809612936e-2
n = 5000 , left side = 1.12604691742690e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41308751545567e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 4.67186009045495e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23560079149074e-2
n = 5000 , left side = 7.47446048721123e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41413881776822e-2
```

x

```
n = 2000 , left side = 3.33066907387547e-16
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749976e-2
n = 5000 , left side = 0.000000000000000e0
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421356237310e-2
```

x^2

```
n = 2000 , left side = 1.32428058681189e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23474369691298e-2
n = 5000 , left side = 2.11884893891456e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41400167747920e-2
```

x^3

```
n = 2000 , left side = 1.98642088024559e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23408155661954e-2
n = 5000 , left side = 3.17827340814980e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41389573503228e-2
```

x^4

```
n = 2000 , left side = 1.98649427156916e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23408148322822e-2
n = 5000 , left side = 3.17829219655119e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41389573315344e-2
```

x^{10}

```
n = 2000 , left side = 2.33024632692092e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23583495286710e-2
```

```
          n = 5000 , left side = 3.72515569103038e-7
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.41417631081618e-2


-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 7.31673691974022e-4
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.16290060830239e-2
          n = 5000 , left side = 2.93115579032333e-4
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.38490200446986e-2
```

$$x$$

```
          n = 2000 , left side = 1.38629436111992e-3
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.09743854138780e-2
          n = 5000 , left side = 5.54517744448146e-4
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.35876178792828e-2
```

$$x^2$$

```
          n = 2000 , left side = 1.39158937464251e-3
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.09690904003554e-2
          n = 5000 , left side = 5.55364946611681e-4
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.35867706771193e-2
```

$$x^3$$

```
          n = 2000 , left side = 1.04767998407165e-3
                     1/n^(1/2) = 2.23606797749979e-2
                     difference = 2.13129997909262e-2
          n = 5000 , left side = 4.17160179930043e-4
                     1/n^(1/2) = 1.41421356237310e-2
                     difference = 1.37249754438009e-2
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443774e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16595565985541e-2
n = 5000 , left side = 2.78531814463148e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38636038092678e-2
```

$$x^{10}$$

```
n = 2000 , left side = 2.80227731776685e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23326570018202e-2
n = 5000 , left side = 1.09803560975803e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41311552676334e-2
```

A = e, Power = 1/2, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.65410972395064e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.19952688026028e-2
n = 5000 , left side = 1.46489688195639e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39956459355353e-2
```

$$x$$

```
n = 2000 , left side = 6.93147180559905e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16675325944380e-2
n = 5000 , left side = 2.77258872224295e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38648767515067e-2
```

$$x^2$$

```
n = 2000 , left side = 6.97000835040928e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16636789399570e-2
n = 5000 , left side = 2.77875456940857e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38642601667901e-2
```

$$x^3$$

```
n = 2000 , left side = 5.25648214541319e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.18350315604566e-2
n = 5000 , left side = 2.08869501476971e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39332661222540e-2
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871060e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20083109511268e-2
n = 5000 , left side = 1.39555255115623e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40025803686153e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079191021e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23464572670788e-2
n = 5000 , left side = 5.52404203211848e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41366115816988e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097031422e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23594898340276e-2
n = 5000 , left side = 1.90387246079560e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41419452364849e-2
```

$$x$$

```
n = 2000 , left side = 1.11022302462516e-16
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749978e-2
n = 5000 , left side = 2.22044604925031e-16
```

```
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41421356237307e-2
```

$$x^2$$

```
n = 2000 , left side = 3.37320146698294e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23573065735309e-2
n = 5000 , left side = 5.39712234737255e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41415959114962e-2
```

$$x^3$$

```
n = 2000 , left side = 5.05980220052993e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23556199727974e-2
n = 5000 , left side = 8.09568352050372e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41413260553789e-2
```

$$x^4$$

```
n = 2000 , left side = 5.05984931557790e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23556199256823e-2
n = 5000 , left side = 8.09569558196666e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41413260541728e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.93100186507866e-7
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23600866748114e-2
n = 5000 , left side = 9.48752488783271e-8
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41420407484821e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383738344e-4
          1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.19944003912596e-2
n = 5000 , left side = 1.46628824907125e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39955067988238e-2
```

x

```
n = 2000 , left side = 6.93147191573207e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.16675325834247e-2
n = 5000 , left side = 2.77258876629438e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38648767471015e-2
```

x^2

```
n = 2000 , left side = 6.94533444929257e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.16661463300686e-2
n = 5000 , left side = 2.77480677166209e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.38646549465647e-2
```

x^3

```
n = 2000 , left side = 5.21941990297453e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.18387377847004e-2
n = 5000 , left side = 2.08277000138729e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39338586235922e-2
```

x^4

```
n = 2000 , left side = 3.48657415094336e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.20120223599036e-2
n = 5000 , left side = 1.38962422999087e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40031732007319e-2
```

x^{10}

```
n = 2000 , left side = 1.37838066333505e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23468959683645e-2
n = 5000 , left side = 5.45433431874500e-6
          1/n^(1/2) = 1.41421356237310e-2
```

```
                    difference = 1.41366812894122e-2


-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 1.83022238703923e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.21776575362940e-2
          n = 5000 , left side = 7.32956220088621e-5
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.40688400017221e-2
```

$$x$$

```
          n = 2000 , left side = 3.46573574531717e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.20141062004662e-2
          n = 5000 , left side = 1.38629429812909e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.40035061939180e-2
```

$$x^2$$

```
          n = 2000 , left side = 3.47599488122574e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.20130802868753e-2
          n = 5000 , left side = 1.38793575987228e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.40033420477437e-2
```

$$x^3$$

```
          n = 2000 , left side = 2.61470034692818e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.20992097403051e-2
          n = 5000 , left side = 1.04218354559454e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.40379172691715e-2
```

$$x^4$$

```
          n = 2000 , left side = 1.74827628399502e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.21858521465984e-2
```

```
n = 5000 , left side = 6.95610601450236e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40725745635859e-2
```

$$x^{10}$$

```
n = 2000 , left side = 6.95028639577117e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23537294886021e-2
n = 5000 , left side = 2.73651920645272e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41393991045245e-2
```

A = e, Power = 1/2, lamda = 1, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.19528048575712e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23603602469493e-2
n = 5000 , left side = 5.11242583822735e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420844994726e-2
```

$$x$$

```
n = 2000 , left side = 1.11022302462516e-16
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749978e-2
n = 5000 , left side = 2.22044604925031e-16
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421356237307e-2
```

$$x^2$$

```
n = 2000 , left side = 9.05800419559455e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23597739745783e-2
n = 5000 , left side = 1.44928067158379e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41419906956638e-2
```

$$x^3$$

```
n = 2000 , left side = 1.35870062942245e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23593210743685e-2
n = 5000 , left side = 2.17392100654301e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41419182316303e-2
```

$$x^4$$

```
n = 2000 , left side = 1.35870389421366e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23593210711037e-2
n = 5000 , left side = 2.17392184295728e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41419182315467e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.59233443428877e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23605205415545e-2
n = 5000 , left side = 2.54759108162493e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421101478201e-2
```

A = e, Power = 7/10, lamda = 1/4, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.45973769075347e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.42992615196117e-3
n = 5000 , left side = 5.85650001354243e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.98901658573621e-3
```

$$x$$

```
n = 2000 , left side = 2.77258872224018e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 2.11707512047447e-3
n = 5000 , left side = 1.10903548889596e-3
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.46563109819449e-3
```

$$x^2$$

```
n = 2000 , left side = 2.79351877633061e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 2.09614506638404e-3
n = 5000 , left side = 1.11238429755023e-3
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.46228228954022e-3
```

$$x^3$$

```
n = 2000 , left side = 2.11096808695641e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 2.77869575575824e-3
n = 5000 , left side = 8.36808243358689e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 1.73785834373176e-3
```

$$x^4$$

```
n = 2000 , left side = 1.41795377434827e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.47171006836638e-3
n = 5000 , left side = 5.59557820777268e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.01510876631318e-3
```

$$x^{10}$$

```
n = 2000 , left side = 5.79591945911288e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.83170464812352e-3
n = 5000 , left side = 2.22575140039899e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.55240907308646e-3
```

A = e, Power = 7/10, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.28207805430370e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.16145603728427e-3
n = 5000 , left side = 2.92559548393023e-4
```

```
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.28210703869743e-3
```

x

```
n = 2000 , left side = 1.38629436111992e-3
          1/n^(7/10) = 4.88966384271464e-3
          difference = 3.50336948159472e-3
n = 5000 , left side = 5.54517744447813e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.02014884264264e-3
```

x^2

```
n = 2000 , left side = 1.40145897904370e-3
          1/n^(7/10) = 4.88966384271464e-3
          difference = 3.48820486367094e-3
n = 5000 , left side = 5.56944083315858e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.01772250377459e-3
```

x^3

```
n = 2000 , left side = 1.06252543720411e-3
          1/n^(7/10) = 4.88966384271464e-3
          difference = 3.82713840551053e-3
n = 5000 , left side = 4.19531511964277e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.15513507512617e-3
```

x^4

```
n = 2000 , left side = 7.16010476710618e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.17365336600403e-3
n = 5000 , left side = 2.80905793970818e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.29376079311963e-3
```

x^{10}

```
n = 2000 , left side = 2.97988137042474e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.85986502901040e-3
n = 5000 , left side = 1.12604691742690e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.56340611791618e-3
```

```
--------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 4.67186009045495e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88499198262419e-3
n = 5000 , left side = 7.47446048721123e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57391914104173e-3
```

$$x$$

```
n = 2000 , left side = 3.33066907387547e-16
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271431e-3
n = 5000 , left side = 0.000000000000000e0
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57466658709045e-3
```

$$x^2$$

```
n = 2000 , left side = 1.32428058681189e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.87642103684653e-3
n = 5000 , left side = 2.11884893891456e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57254773815153e-3
```

$$x^3$$

```
n = 2000 , left side = 1.98642088024559e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.86979963391219e-3
n = 5000 , left side = 3.17827340814980e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57148831368230e-3
```

$$x^4$$

```
n = 2000 , left side = 1.98649427156916e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.86979889999895e-3
n = 5000 , left side = 3.17829219655119e-6
```

```
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57148829489390e-3
```

$$x^{10}$$

```
      n = 2000 , left side = 2.33024632692092e-6
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.88733359638772e-3
      n = 5000 , left side = 3.72515569103038e-7
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57429407152135e-3


--------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
      n = 2000 , left side = 7.31673691974022e-4
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.15799015074062e-3
      n = 5000 , left side = 2.93115579032333e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.28155100805812e-3
```

$$x$$

```
      n = 2000 , left side = 1.38629436111992e-3
                1/n^(7/10) = 4.88966384271464e-3
                difference = 3.50336948159472e-3
      n = 5000 , left side = 5.54517744448146e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.02014884264230e-3
```

$$x^2$$

```
      n = 2000 , left side = 1.39158937464251e-3
                1/n^(7/10) = 4.88966384271464e-3
                difference = 3.49807446807213e-3
      n = 5000 , left side = 5.55364946611681e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.01930164047877e-3
```

$$x^3$$

```
      n = 2000 , left side = 1.04767998407165e-3
                1/n^(7/10) = 4.88966384271464e-3
```

```
          difference = 3.84198385864299e-3
n = 5000 , left side = 4.17160179930043e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.15750640716041e-3
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443774e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.18854066627087e-3
n = 5000 , left side = 2.78531814463148e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.29613477262730e-3
```

$$x^{10}$$

```
n = 2000 , left side = 2.80227731776685e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.86164106953698e-3
n = 5000 , left side = 1.09803560975803e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.56368623099287e-3
```

```
-------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.65410972395064e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.52425287031958e-3
n = 5000 , left side = 1.46489688195639e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.42817689889481e-3
```

$$x$$

```
n = 2000 , left side = 6.93147180559905e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.19651666215474e-3
n = 5000 , left side = 2.77258872224295e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.29740771486615e-3
```

$$x^2$$

```
n = 2000 , left side = 6.97000835040928e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.19266300767372e-3
n = 5000 , left side = 2.77875456940857e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29679113014959e-3
```

$$x^3$$

```
n = 2000 , left side = 5.25648214541319e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.36401562817333e-3
n = 5000 , left side = 2.08869501476971e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.36579708561348e-3
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871060e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.53729501884358e-3
n = 5000 , left side = 1.39555255115623e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43511133197483e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079191021e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.87544133479554e-3
n = 5000 , left side = 5.52404203211848e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.56914254505833e-3
```

```
-------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097031422e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88847390174433e-3
n = 5000 , left side = 1.90387246079560e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57447619984437e-3
```

x

```
n = 2000 , left side = 1.11022302462516e-16
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271453e-3
n = 5000 , left side = 2.22044604925031e-16
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57466658709023e-3
```

x^2

```
n = 2000 , left side = 3.37320146698294e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88629064124766e-3
n = 5000 , left side = 5.39712234737255e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57412687485571e-3
```

x^3

```
n = 2000 , left side = 5.05980220052993e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88460404051411e-3
n = 5000 , left side = 8.09568352050372e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57385701873840e-3
```

x^4

```
n = 2000 , left side = 5.05984931557790e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88460399339907e-3
n = 5000 , left side = 8.09569558196666e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57385701753225e-3
```

x^{10}

```
n = 2000 , left side = 5.93100186507866e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88907074252814e-3
n = 5000 , left side = 9.48752488783271e-8
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57457171184157e-3
```

```
A = e, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383738344e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.52338445897630e-3
n = 5000 , left side = 1.46628824907125e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.42803776218332e-3
```

$$x$$

```
n = 2000 , left side = 6.93147191573207e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.19651665114144e-3
n = 5000 , left side = 2.77258876629438e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29740771046101e-3
```

$$x^2$$

```
n = 2000 , left side = 6.94533444929257e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.19513039778539e-3
n = 5000 , left side = 2.77480677166209e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29718590992424e-3
```

$$x^3$$

```
n = 2000 , left side = 5.21941990297453e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.36772185241719e-3
n = 5000 , left side = 2.08277000138729e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.36638958695172e-3
```

$$x^4$$

```
n = 2000 , left side = 3.48657415094336e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54100642762031e-3
n = 5000 , left side = 1.38962422999087e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43570416409136e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.37838066333505e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.87588003608129e-3
n = 5000 , left side = 5.45433431874500e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.56921225277170e-3
```

A = e, Power = 7/10, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83022238703923e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.70664160401072e-3
n = 5000 , left side = 7.32956220088621e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.50137096508159e-3
```

$$x$$

```
n = 2000 , left side = 3.46573574531717e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54309026818293e-3
n = 5000 , left side = 1.38629429812909e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43603715727754e-3
```

$$x^2$$

```
n = 2000 , left side = 3.47599488122574e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54206435459207e-3
n = 5000 , left side = 1.38793575987228e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43587301110322e-3
```

$$x^3$$

```
n = 2000 , left side = 2.61470034692818e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.62819380802183e-3
n = 5000 , left side = 1.04218354559454e-4
```

```
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.47044823253099e-3
```

$$x^4$$

```
        n = 2000 , left side = 1.74827628399502e-4
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.71483621431514e-3
        n = 5000 , left side = 6.95610601450236e-5
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.50510552694542e-3
```

$$x^{10}$$

```
        n = 2000 , left side = 6.95028639577117e-6
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.88271355631887e-3
        n = 5000 , left side = 2.73651920645272e-6
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57193006788400e-3


--------------------------------------------------------------------------------
A = e, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 2000 , left side = 3.19528048575712e-7
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.88934431466607e-3
        n = 5000 , left side = 5.11242583822735e-8
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57461546283207e-3
```

$$x$$

```
        n = 2000 , left side = 1.11022302462516e-16
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.88966384271453e-3
        n = 5000 , left side = 2.22044604925031e-16
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57466658709023e-3
```

$$x^2$$

```
        n = 2000 , left side = 9.05800419559455e-7
                1/n^(7/10) = 4.88966384271464e-3
```

```
          difference = 4.88875804229508e-3
n = 5000 , left side = 1.44928067158379e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57452165902329e-3
```

x^3

```
n = 2000 , left side = 1.35870062942245e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88830514208522e-3
n = 5000 , left side = 2.17392100654301e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57444919498979e-3
```

x^4

```
n = 2000 , left side = 1.35870389421366e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88830513882043e-3
n = 5000 , left side = 2.17392184295728e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57444919490615e-3
```

x^{10}

```
n = 2000 , left side = 1.59233443428877e-7
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88950460927122e-3
n = 5000 , left side = 2.54759108162493e-8
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57464111117963e-3
```

9 Real-valued neural network approximation based on q-deformed and λ-parametrized A-generalized logistic function - part 3

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

As = [2.5, e, 3] #values for A, they all must be > 2


funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for A in As:
        ##########################################################
        for power in powers:      #going over various powers for 1/n^power
            ##########################################################
            for lamda in lamdas:  #going over each lamda value
            ##########################################################
                for q in qs:      #going over each q value
                ##########################################################
                    print()
                    print()
                   ␣
 ↪print("-------------------------------------------------------------------------------")
                    print("A = "+str(A) + ", Power = "+ str(power)+ ", lamda =␣
 ↪"+ str(lamda) + ",  q = " + str(q) )
                   ␣
 ↪print("-------------------------------------------------------------------------------")

                    #the activation function
                    phi(x) = 1/(1+q*(A^(-lamda*x)))   #formula 16.1

                    #q-deformed and λ-parametrized A-generalized logistic␣
 ↪function
                    G(x) = 1/2*(phi(x+1) - phi(x-1))    #formula 16.5

                    ##########################################################
                    for i in range(len(funcs)):
```

```
                    ##########################################################
                        f(x)=funcs[i]
                        show(f(x))
                        for n in [10000, 20000]:
                            #def L(n, f, x):    #real-valued linear neural␣
↪network operators
                            #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                            #leftSide = abs(L(n,f,x0)-f(x0))
                            leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in␣
↪[ceil(n*a),..,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)])-f(x0))
                            val1 = n
                            val2 = leftSide.n()
                            val3 = 1/(n^power).n()
                            print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10000 , left side = 4.27572020341493e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.26681624276778e-2
          n = 20000 , left side = 2.13874151307691e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.10357873539527e-2
```

$$\cos(x)$$

```
          n = 10000 , left side = 4.28276666643801e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.26674577813755e-2
          n = 20000 , left side = 2.14050312918324e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.10356111923421e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10000 , left side = 2.13706972073791e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28820274759455e-2
n = 20000 , left side = 1.06917314901978e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11427441903584e-2
```

$$\cos(x)$$

```
n = 10000 , left side = 2.14217391009575e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28815170570098e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient
As = [2.5, e, 3] #values for A, they all must be > 2

funcs = [x^(1/3),x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for A in As:
    ##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
               ␣
 ↪print("-------------------------------------------------------------------------------")
                print("A = "+str(A) + ", Power = "+ str(power)+ ", lamda = "+␣
 ↪str(lamda) + ",  q = " + str(q) )
               ␣
 ↪print("-------------------------------------------------------------------------------")

                #the activation function
                phi(x) = 1/(1+q*(A^(-lamda*x)))   #formula 16.1
```

```
                #q-deformed and λ-parametrized A-generalized logistic function
                G(x) = 1/2*(phi(x+1) - phi(x-1))    #formula 16.5

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [10000, 20000]:
                        #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                        #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(L(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 3.19868349176222e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.27758660988431e-2
          n = 20000 , left side = 1.60021856650885e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.10896396486095e-2
```

$$x$$

```
          n = 10000 , left side = 6.05176637892724e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.24905578101266e-2
          n = 20000 , left side = 3.02588318947472e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.09470731863129e-2
```

$$x^2$$

```
n = 10000 , left side = 6.06173158515411e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.24895612895039e-2
n = 20000 , left side = 3.02837449102422e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.09468240561580e-2
```

$$x^3$$

```
n = 10000 , left side = 4.55378625288161e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.26403558227312e-2
n = 20000 , left side = 2.27315105185255e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.10223464000751e-2
```

$$x^4$$

```
n = 10000 , left side = 3.04085834932244e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.27916486130871e-2
n = 20000 , left side = 1.51668196389315e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.10979933088711e-2
```

$$x^{10}$$

```
n = 10000 , left side = 1.19963169076507e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30837381311117e-2
n = 20000 , left side = 5.95388123934728e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12437076240210e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.59855272210709e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29358791758086e-2
n = 20000 , left side = 7.99912068450116e-5
```

```
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11696702984154e-2
```

x

```
n = 10000 , left side = 3.02588318946473e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.27931461290729e-2
n = 20000 , left side = 1.51294159473236e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.10983673457871e-2
```

x^2

```
n = 10000 , left side = 3.03310160496728e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.27924242875226e-2
n = 20000 , left side = 1.51474619861203e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.10981868853992e-2
```

x^3

```
n = 10000 , left side = 2.28024601388044e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28677098466313e-2
n = 20000 , left side = 1.13741385167759e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11359201200926e-2
```

x^4

```
n = 10000 , left side = 1.52378123521993e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29433563244973e-2
n = 20000 , left side = 7.59179204072313e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11737435848531e-2
```

x^{10}

```
n = 10000 , left side = 6.03738331946143e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30896970646999e-2
n = 20000 , left side = 2.98675631447520e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12466747489459e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 2.22336443696920e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955121115756e-2
n = 20000 , left side = 5.55839482078511e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496059213122e-2
```

$$x$$

```
n = 10000 , left side = 1.11022302462516e-16
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957344480192e-2
n = 20000 , left side = 0.000000000000000e0
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496615052604e-2
```

$$x^2$$

```
n = 10000 , left side = 6.30281859426152e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30951041661599e-2
n = 20000 , left side = 1.57570464953682e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12495039347954e-2
```

$$x^3$$

```
n = 10000 , left side = 9.45422789111472e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30947890252302e-2
n = 20000 , left side = 2.36355697263990e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12494251495631e-2
```

$$x^4$$

```
n = 10000 , left side = 9.45424452655774e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30947890235667e-2
n = 20000 , left side = 2.36355801264132e-7
```

```
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12494251494591e-2
```

$$x^{10}$$

```
      n = 10000 , left side = 1.10797191375410e-7
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30956236508280e-2
      n = 20000 , left side = 2.76982744143017e-8
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496338069860e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
      n = 10000 , left side = 1.60020975648468e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.29357134723709e-2
      n = 20000 , left side = 8.00326534398624e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11696288518205e-2
```

$$x$$

```
      n = 10000 , left side = 3.02588318946695e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.27931461290726e-2
      n = 20000 , left side = 1.51294159473570e-4
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.10983673457868e-2
```

$$x^2$$

```
      n = 10000 , left side = 3.02839949102240e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.27928944989171e-2
      n = 20000 , left side = 1.51357067012414e-4
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.10983044382480e-2
```

$$x^3$$

```
      n = 10000 , left side = 2.27318857454500e-4
                1/n^(3/10) = 6.30957344480193e-2
```

```
          difference = 6.28684155905648e-2
n = 20000 , left side = 1.13565002539645e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11360965027207e-2
```

$$x^4$$

```
n = 10000 , left side = 1.51671950931812e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29440624970875e-2
n = 20000 , left side = 7.57414843104987e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11739200209499e-2
```

$$x^{10}$$

```
n = 10000 , left side = 5.95432283236356e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30897801251870e-2
n = 20000 , left side = 2.96604233440191e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12466954629260e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.99903253990541e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30157441226203e-2
n = 20000 , left side = 4.00112866246527e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12096502186357e-2
```

$$x$$

```
n = 10000 , left side = 1.51294159472459e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29444402885469e-2
n = 20000 , left side = 7.56470797363962e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11740144255240e-2
```

$$x^2$$

```
n = 10000 , left side = 1.51477119860799e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29442573281585e-2
n = 20000 , left side = 7.56928198333284e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11739686854270e-2
```

$$x^3$$

```
n = 10000 , left side = 1.13745136302468e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29819893117169e-2
n = 20000 , left side = 5.68039294622513e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11928575757981e-2
```

$$x^4$$

```
n = 10000 , left side = 7.59216726793632e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30198127753400e-2
n = 20000 , left side = 3.78921690507572e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12117693362096e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.98719684030391e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30927472511790e-2
n = 20000 , left side = 1.48553122383387e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12481759740365e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 5.64658384158060e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956779821809e-2
n = 20000 , left side = 1.41164483592513e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496473888120e-2
```

$$x$$

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957344480193e-2
n = 20000 , left side = 2.22044604925031e-16
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496615052602e-2
```

$$x^2$$

```
n = 10000 , left side = 1.60070465160533e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955743775542e-2
n = 20000 , left side = 4.00176163872779e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496214876440e-2
```

$$x^3$$

```
n = 10000 , left side = 2.40105697518755e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30954943423218e-2
n = 20000 , left side = 6.00264244421389e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496014788359e-2
```

$$x^4$$

```
n = 10000 , left side = 2.40105803711588e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30954943422156e-2
n = 20000 , left side = 6.00264309924547e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496014788294e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.81377353159983e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957063102840e-2
n = 20000 , left side = 7.03436840807786e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496544708920e-2
```

```
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 8.00317719682848e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30157026760510e-2
n = 20000 , left side = 4.00216508639039e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12096398543965e-2
```

$$x$$

```
n = 10000 , left side = 1.51294159424054e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29444402885953e-2
n = 20000 , left side = 7.56470797119713e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11740144255484e-2
```

$$x^2$$

```
n = 10000 , left side = 1.51359566962606e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29443748810567e-2
n = 20000 , left side = 7.56634315967064e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11739980736637e-2
```

$$x^3$$

```
n = 10000 , left side = 1.13568753636911e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29821656943824e-2
n = 20000 , left side = 5.67598404561109e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11929016648043e-2
```

$$x^4$$

```
n = 10000 , left side = 7.57452365556383e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30199892114637e-2
n = 20000 , left side = 3.78480733740777e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12118134318863e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.96648285340014e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30927679651659e-2
n = 20000 , left side = 1.48035905045700e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12481811462099e-2
```

```
--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 4.00104046383752e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30557240433810e-2
n = 20000 , left side = 2.00094550824779e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12296520501779e-2
```

$$x$$

```
n = 10000 , left side = 7.56470791325459e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30200873688868e-2
n = 20000 , left side = 3.78235395663840e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12118379656940e-2
```

$$x^2$$

```
n = 10000 , left side = 7.56953192294074e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30200391287899e-2
n = 20000 , left side = 3.78355995903634e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12118259056700e-2
```

$$x^3$$

```
n = 10000 , left side = 5.68076795765537e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30389267684428e-2
n = 20000 , left side = 2.83857459712489e-5
```

```
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12212757592891e-2
```

$$x^4$$

```
        n = 10000 , left side = 3.78959198840678e-5
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30578385281353e-2
        n = 20000 , left side = 1.89298623404777e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12307316429199e-2
```

$$x^{10}$$

```
        n = 10000 , left side = 1.48597119931765e-6
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30942484768200e-2
        n = 20000 , left side = 7.40862116549749e-7
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12489206431438e-2


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10000 , left side = 1.49983394238911e-8
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30957194496799e-2
        n = 20000 , left side = 3.74958442504910e-9
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496577556759e-2
```

$$x$$

```
        n = 10000 , left side = 2.77555756156289e-16
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30957344480191e-2
        n = 20000 , left side = 1.11022302462516e-16
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496615052603e-2
```

$$x^2$$

```
        n = 10000 , left side = 4.25176165941288e-8
                1/n^(3/10) = 6.30957344480193e-2
```

```
          difference = 6.30956919304027e-2
n = 20000 , left side = 1.06294040791433e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496508758563e-2
```

$$x^3$$

```
n = 10000 , left side = 6.37764248911932e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956706715944e-2
n = 20000 , left side = 1.59441061742260e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496455611542e-2
```

$$x^4$$

```
n = 10000 , left side = 6.37764321631540e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956706715872e-2
n = 20000 , left side = 1.59441067154598e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496455611537e-2
```

$$x^{10}$$

```
n = 10000 , left side = 7.47382359559540e-9
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957269741957e-2
n = 20000 , left side = 1.86845143632271e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496596368089e-2
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 3.19868349176222e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.68013165082378e-3
n = 20000 , left side = 1.60021856650885e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.91104595521459e-3
```

$$x$$

```
n = 10000 , left side = 6.05176637892724e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.39482336210728e-3
n = 20000 , left side = 3.02588318947472e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.76847949291800e-3
```

$$x^2$$

```
n = 10000 , left side = 6.06173158515411e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.39382684148459e-3
n = 20000 , left side = 3.02837449102422e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.76823036276305e-3
```

$$x^3$$

```
n = 10000 , left side = 4.55378625288161e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.54462137471184e-3
n = 20000 , left side = 2.27315105185255e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.84375270668022e-3
```

$$x^4$$

```
n = 10000 , left side = 3.04085834932244e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.69591416506776e-3
n = 20000 , left side = 1.51668196389315e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.91939961547616e-3
```

$$x^{10}$$

```
n = 10000 , left side = 1.19963169076507e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.98800368309235e-3
n = 20000 , left side = 5.95388123934728e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06511393062613e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.59855272210709e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.84014472778929e-3
n = 20000 , left side = 7.99912068450116e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99107660502046e-3
```

$$x$$

```
n = 10000 , left side = 3.02588318946473e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.69741168105353e-3
n = 20000 , left side = 1.51294159473236e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.91977365239224e-3
```

$$x^2$$

```
n = 10000 , left side = 3.03310160496728e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.69668983950327e-3
n = 20000 , left side = 1.51474619861203e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.91959319200427e-3
```

$$x^3$$

```
n = 10000 , left side = 2.28024601388044e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.77197539861196e-3
n = 20000 , left side = 1.13741385167759e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.95732642669772e-3
```

$$x^4$$

```
n = 10000 , left side = 1.52378123521993e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.84762187647801e-3
n = 20000 , left side = 7.59179204072313e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99514989145824e-3
```

$$x^{10}$$

```
n = 10000 , left side = 6.03738331946143e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99396261668054e-3
n = 20000 , left side = 2.98675631447520e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06808105555100e-3


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 2.22336443696920e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99977766355630e-3
n = 20000 , left side = 5.55839482078511e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07101222791727e-3
```

$$x$$

```
n = 10000 , left side = 1.11022302462516e-16
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99999999999989e-3
n = 20000 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106781186548e-3
```

$$x^2$$

```
n = 10000 , left side = 6.30281859426152e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99936971814057e-3
n = 20000 , left side = 1.57570464953682e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07091024140052e-3
```

$$x^3$$

```
n = 10000 , left side = 9.45422789111472e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99905457721089e-3
n = 20000 , left side = 2.36355697263990e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07083145616821e-3
```

$$x^4$$

```
n = 10000 , left side = 9.45424452655774e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99905457554734e-3
n = 20000 , left side = 2.36355801264132e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07083145606421e-3
```

$$x^{10}$$

```
n = 10000 , left side = 1.10797191375410e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99988920280863e-3
n = 20000 , left side = 2.76982744143017e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07104011359106e-3
```

A = 2.50000000000000e0, Power = 1/2, lamda = 1/2, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.60020975648468e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.83997902435153e-3
n = 20000 , left side = 8.00326534398624e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99103515842561e-3
```

$$x$$

```
n = 10000 , left side = 3.02588318946695e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.69741168105331e-3
n = 20000 , left side = 1.51294159473570e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.91977365239191e-3
```

$$x^2$$

```
n = 10000 , left side = 3.02839949102240e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.69716005089776e-3
n = 20000 , left side = 1.51357067012414e-4
```

```
                1/n^(1/2) = 7.07106781186548e-3
                difference = 6.91971074485306e-3
```

$$x^3$$

```
n = 10000 , left side = 2.27318857454500e-4
                1/n^(1/2) = 1.00000000000000e-2
                difference = 9.77268114254550e-3
n = 20000 , left side = 1.13565002539645e-4
                1/n^(1/2) = 7.07106781186548e-3
                difference = 6.95750280932583e-3
```

$$x^4$$

```
n = 10000 , left side = 1.51671950931812e-4
                1/n^(1/2) = 1.00000000000000e-2
                difference = 9.84832804906819e-3
n = 20000 , left side = 7.57414843104987e-5
                1/n^(1/2) = 7.07106781186548e-3
                difference = 6.99532632755498e-3
```

$$x^{10}$$

```
n = 10000 , left side = 5.95432283236356e-6
                1/n^(1/2) = 1.00000000000000e-2
                difference = 9.99404567716764e-3
n = 20000 , left side = 2.96604233440191e-6
                1/n^(1/2) = 7.07106781186548e-3
                difference = 7.06810176953107e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.99903253990541e-5
                1/n^(1/2) = 1.00000000000000e-2
                difference = 9.92000967460095e-3
n = 20000 , left side = 4.00112866246527e-5
                1/n^(1/2) = 7.07106781186548e-3
                difference = 7.03105652524082e-3
```

$$x$$

```
n = 10000 , left side = 1.51294159472459e-4
                1/n^(1/2) = 1.00000000000000e-2
```

```
          difference = 9.84870584052754e-3
n = 20000 , left side = 7.56470797363962e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99542073212908e-3
```

$$x^2$$

```
n = 10000 , left side = 1.51477119860799e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.84852288013920e-3
n = 20000 , left side = 7.56928198333284e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99537499203215e-3
```

$$x^3$$

```
n = 10000 , left side = 1.13745136302468e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.88625486369753e-3
n = 20000 , left side = 5.68039294622513e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.01426388240322e-3
```

$$x^4$$

```
n = 10000 , left side = 7.59216726793632e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.92407832732064e-3
n = 20000 , left side = 3.78921690507572e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03317564281472e-3
```

$$x^{10}$$

```
n = 10000 , left side = 2.98719684030391e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99701280315970e-3
n = 20000 , left side = 1.48553122383387e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06958228064164e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 5.64658384158060e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99994353416158e-3
n = 20000 , left side = 1.41164483592513e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07105369541712e-3
```

x

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.00000000000000e-2
          difference = 1.00000000000000e-2
n = 20000 , left side = 2.22044604925031e-16
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106781186525e-3
```

x^2

```
n = 10000 , left side = 1.60070465160533e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99983992953484e-3
n = 20000 , left side = 4.00176163872779e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07102779424909e-3
```

x^3

```
n = 10000 , left side = 2.40105697518755e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99975989430248e-3
n = 20000 , left side = 6.00264244421389e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07100778544103e-3
```

x^4

```
n = 10000 , left side = 2.40105803711588e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99975989419629e-3
n = 20000 , left side = 6.00264309924547e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07100778543448e-3
```

x^{10}

```
n = 10000 , left side = 2.81377353159983e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99997186226468e-3
```

```
          n = 20000 , left side = 7.03436840807786e-9
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 7.07106077749707e-3


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 8.00317719682848e-5
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.91996822803172e-3
          n = 20000 , left side = 4.00216508639039e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 7.03104616100157e-3
```

$$x$$

```
          n = 10000 , left side = 1.51294159424054e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.84870584057595e-3
          n = 20000 , left side = 7.56470797119713e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 6.99542073215350e-3
```

$$x^2$$

```
          n = 10000 , left side = 1.51359566962606e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.84864043303739e-3
          n = 20000 , left side = 7.56634315967064e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 6.99540438026877e-3
```

$$x^3$$

```
          n = 10000 , left side = 1.13568753636911e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.88643124636309e-3
          n = 20000 , left side = 5.67598404561109e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 7.01430797140936e-3
```

$$x^4$$

```
n = 10000 , left side = 7.57452365556383e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.92425476344436e-3
n = 20000 , left side = 3.78480733740777e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03321973849140e-3
```

$$x^{10}$$

```
n = 10000 , left side = 2.96648285340014e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99703351714660e-3
n = 20000 , left side = 1.48035905045700e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06958745281502e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 4.00104046383752e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.95998959536163e-3
n = 20000 , left side = 2.00094550824779e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.05105835678300e-3
```

$$x$$

```
n = 10000 , left side = 7.56470791325459e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.92435292086745e-3
n = 20000 , left side = 3.78235395663840e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03324427229909e-3
```

$$x^2$$

```
n = 10000 , left side = 7.56953192294074e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.92430468077059e-3
n = 20000 , left side = 3.78355995903634e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03323221227511e-3
```

$$x^3$$

```
n = 10000 , left side = 5.68076795765537e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.94319232042345e-3
n = 20000 , left side = 2.83857459712489e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.04268206589423e-3
```

$$x^4$$

```
n = 10000 , left side = 3.78959198840678e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.96210408011593e-3
n = 20000 , left side = 1.89298623404777e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.05213794952500e-3
```

$$x^{10}$$

```
n = 10000 , left side = 1.48597119931765e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99851402880068e-3
n = 20000 , left side = 7.40862116549749e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07032694974893e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 1/2, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.49983394238911e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99998500166058e-3
n = 20000 , left side = 3.74958442504910e-9
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106406228105e-3
```

$$x$$

```
n = 10000 , left side = 2.77555756156289e-16
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99999999999972e-3
n = 20000 , left side = 1.11022302462516e-16
```

```
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106781186536e-3
```

$$x^2$$

```
n = 10000 , left side = 4.25176165941288e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99995748238341e-3
n = 20000 , left side = 1.06294040791433e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07105718246140e-3
```

$$x^3$$

```
n = 10000 , left side = 6.37764248911932e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99993622357511e-3
n = 20000 , left side = 1.59441061742260e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07105186775930e-3
```

$$x^4$$

```
n = 10000 , left side = 6.37764321631540e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99993622356784e-3
n = 20000 , left side = 1.59441067154598e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07105186775876e-3
```

$$x^{10}$$

```
n = 10000 , left side = 7.47382359559540e-9
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99999252617640e-3
n = 20000 , left side = 1.86845143632271e-9
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106594341404e-3
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 3.19868349176222e-4
          1/n^(7/10) = 1.58489319246111e-3
```

```
          difference = 1.26502484328489e-3
n = 20000 , left side = 1.60021856650885e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.15594343172560e-4
```

x

```
n = 10000 , left side = 6.05176637892724e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 9.79716554568390e-4
n = 20000 , left side = 3.02588318947472e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 6.73027880875973e-4
```

x^2

```
n = 10000 , left side = 6.06173158515411e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 9.78720033945703e-4
n = 20000 , left side = 3.02837449102422e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 6.72778750721023e-4
```

x^3

```
n = 10000 , left side = 4.55378625288161e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.12951456717295e-3
n = 20000 , left side = 2.27315105185255e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 7.48301094638190e-4
```

x^4

```
n = 10000 , left side = 3.04085834932244e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.28080735752887e-3
n = 20000 , left side = 1.51668196389315e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.23948003434130e-4
```

x^{10}

```
n = 10000 , left side = 1.19963169076507e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.57289687555346e-3
n = 20000 , left side = 5.95388123934728e-6
          1/n^(7/10) = 9.75616199823445e-4
```

```
                    difference = 9.69662318584098e-4


-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 1.59855272210709e-4
                    1/n^(7/10) = 1.58489319246111e-3
                    difference = 1.42503792025041e-3
          n = 20000 , left side = 7.99912068450116e-5
                    1/n^(7/10) = 9.75616199823445e-4
                    difference = 8.95624992978433e-4
```

$$x$$

```
          n = 10000 , left side = 3.02588318946473e-4
                    1/n^(7/10) = 1.58489319246111e-3
                    difference = 1.28230487351464e-3
          n = 20000 , left side = 1.51294159473236e-4
                    1/n^(7/10) = 9.75616199823445e-4
                    difference = 8.24322040350209e-4
```

$$x^2$$

```
          n = 10000 , left side = 3.03310160496728e-4
                    1/n^(7/10) = 1.58489319246111e-3
                    difference = 1.28158303196439e-3
          n = 20000 , left side = 1.51474619861203e-4
                    1/n^(7/10) = 9.75616199823445e-4
                    difference = 8.24141579962242e-4
```

$$x^3$$

```
          n = 10000 , left side = 2.28024601388044e-4
                    1/n^(7/10) = 1.58489319246111e-3
                    difference = 1.35686859107307e-3
          n = 20000 , left side = 1.13741385167759e-4
                    1/n^(7/10) = 9.75616199823445e-4
                    difference = 8.61874814655686e-4
```

$$x^4$$

```
          n = 10000 , left side = 1.52378123521993e-4
                    1/n^(7/10) = 1.58489319246111e-3
                    difference = 1.43251506893912e-3
```

```
n = 20000 , left side = 7.59179204072313e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.99698279416214e-4
```

$$x^{10}$$

```
n = 10000 , left side = 6.03738331946143e-6
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.57885580914165e-3
n = 20000 , left side = 2.98675631447520e-6
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.72629443508970e-4
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 2.22336443696920e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58467085601742e-3
n = 20000 , left side = 5.55839482078511e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75560615875237e-4
```

$$x$$

```
n = 10000 , left side = 1.11022302462516e-16
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58489319246100e-3
n = 20000 , left side = 0.000000000000000e0
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75616199823445e-4
```

$$x^2$$

```
n = 10000 , left side = 6.30281859426152e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58426291060169e-3
n = 20000 , left side = 1.57570464953682e-7
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75458629358491e-4
```

$$x^3$$

```
n = 10000 , left side = 9.45422789111472e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58394776967200e-3
n = 20000 , left side = 2.36355697263990e-7
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75379844126181e-4
```

$$x^4$$

```
n = 10000 , left side = 9.45424452655774e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58394776800846e-3
n = 20000 , left side = 2.36355801264132e-7
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75379844022181e-4
```

$$x^{10}$$

```
n = 10000 , left side = 1.10797191375410e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58478239526974e-3
n = 20000 , left side = 2.76982744143017e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75588501549031e-4
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.60020975648468e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.42487221681265e-3
n = 20000 , left side = 8.00326534398624e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.95583546383583e-4
```

$$x$$

```
n = 10000 , left side = 3.02588318946695e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.28230487351442e-3
n = 20000 , left side = 1.51294159473570e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.24322040349876e-4
```

$$x^2$$

```
n = 10000 , left side = 3.02839949102240e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.28205324335887e-3
n = 20000 , left side = 1.51357067012414e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.24259132811031e-4
```

$$x^3$$

```
n = 10000 , left side = 2.27318857454500e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.35757433500661e-3
n = 20000 , left side = 1.13565002539645e-4
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.62051197283800e-4
```

$$x^4$$

```
n = 10000 , left side = 1.51671950931812e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.43322124152930e-3
n = 20000 , left side = 7.57414843104987e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.99874715512946e-4
```

$$x^{10}$$

```
n = 10000 , left side = 5.95432283236356e-6
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.57893886962875e-3
n = 20000 , left side = 2.96604233440191e-6
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.72650157489043e-4
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.99903253990541e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.50490286706206e-3
n = 20000 , left side = 4.00112866246527e-5
```

```
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.35604913198792e-4
```

x

```
n = 10000 , left side = 1.51294159472459e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.43359903298865e-3
n = 20000 , left side = 7.56470797363962e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.99969120087049e-4
```

x^2

```
n = 10000 , left side = 1.51477119860799e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.43341607260032e-3
n = 20000 , left side = 7.56928198333284e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 8.99923379990117e-4
```

x^3

```
n = 10000 , left side = 1.13745136302468e-4
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.47114805615865e-3
n = 20000 , left side = 5.68039294622513e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.18812270361194e-4
```

x^4

```
n = 10000 , left side = 7.59216726793632e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.50897151978175e-3
n = 20000 , left side = 3.78921690507572e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.37724030772688e-4
```

x^{10}

```
n = 10000 , left side = 2.98719684030391e-6
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58190599562081e-3
n = 20000 , left side = 1.48553122383387e-6
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.74130668599611e-4
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 5.64658384158060e-8
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58483672662270e-3
n = 20000 , left side = 1.41164483592513e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75602083375086e-4
```

$$x$$

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58489319246111e-3
n = 20000 , left side = 2.22044604925031e-16
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75616199823223e-4
```

$$x^2$$

```
n = 10000 , left side = 1.60070465160533e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58473312199595e-3
n = 20000 , left side = 4.00176163872779e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75576182207058e-4
```

$$x^3$$

```
n = 10000 , left side = 2.40105697518755e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58465308676360e-3
n = 20000 , left side = 6.00264244421389e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75556173399003e-4
```

$$x^4$$

```
n = 10000 , left side = 2.40105803711588e-7
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58465308665740e-3
n = 20000 , left side = 6.00264309924547e-8
```

```
                1/n^(7/10) = 9.75616199823445e-4
                difference = 9.75556173392453e-4
```

$$x^{10}$$

```
        n = 10000 , left side = 2.81377353159983e-8
                1/n^(7/10) = 1.58489319246111e-3
                difference = 1.58486505472580e-3
        n = 20000 , left side = 7.03436840807786e-9
                1/n^(7/10) = 9.75616199823445e-4
                difference = 9.75609165455037e-4


--------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10000 , left side = 8.00317719682848e-5
                1/n^(7/10) = 1.58489319246111e-3
                difference = 1.50486142049283e-3
        n = 20000 , left side = 4.00216508639039e-5
                1/n^(7/10) = 9.75616199823445e-4
                difference = 9.35594548959541e-4
```

$$x$$

```
        n = 10000 , left side = 1.51294159424054e-4
                1/n^(7/10) = 1.58489319246111e-3
                difference = 1.43359903303706e-3
        n = 20000 , left side = 7.56470797119713e-5
                1/n^(7/10) = 9.75616199823445e-4
                difference = 8.99969120111474e-4
```

$$x^2$$

```
        n = 10000 , left side = 1.51359566962606e-4
                1/n^(7/10) = 1.58489319246111e-3
                difference = 1.43353362549851e-3
        n = 20000 , left side = 7.56634315967064e-5
                1/n^(7/10) = 9.75616199823445e-4
                difference = 8.99952768226739e-4
```

$$x^3$$

```
        n = 10000 , left side = 1.13568753636911e-4
                1/n^(7/10) = 1.58489319246111e-3
```

```
          difference = 1.47132443882420e-3
n = 20000 , left side = 5.67598404561109e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.18856359367334e-4
```

$$x^4$$

```
n = 10000 , left side = 7.57452365556383e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.50914795590548e-3
n = 20000 , left side = 3.78480733740777e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.37768126449367e-4
```

$$x^{10}$$

```
n = 10000 , left side = 2.96648285340014e-6
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58192670960771e-3
n = 20000 , left side = 1.48035905045700e-6
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.74135840772988e-4
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 4.00104046383752e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.54488278782274e-3
n = 20000 , left side = 2.00094550824779e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.55606744740967e-4
```

$$x$$

```
n = 10000 , left side = 7.56470791325459e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.50924611332857e-3
n = 20000 , left side = 3.78235395663840e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.37792660257061e-4
```

$$x^2$$

```
n = 10000 , left side = 7.56953192294074e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.50919787323171e-3
n = 20000 , left side = 3.78355995903634e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.37780600233082e-4
```

$$x^3$$

```
n = 10000 , left side = 5.68076795765537e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.52808551288456e-3
n = 20000 , left side = 2.83857459712489e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.47230453852196e-4
```

$$x^4$$

```
n = 10000 , left side = 3.78959198840678e-5
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.54699727257705e-3
n = 20000 , left side = 1.89298623404777e-5
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.56686337482967e-4
```

$$x^{10}$$

```
n = 10000 , left side = 1.48597119931765e-6
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58340722126180e-3
n = 20000 , left side = 7.40862116549749e-7
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.74875337706895e-4
```

```
-------------------------------------------------------------------------------
A = 2.50000000000000e0, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.49983394238911e-8
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58487819412169e-3
n = 20000 , left side = 3.74958442504910e-9
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75612450239020e-4
```

$$x$$

```
n = 10000 , left side = 2.77555756156289e-16
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58489319246084e-3
n = 20000 , left side = 1.11022302462516e-16
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75616199823334e-4
```

$$x^2$$

```
n = 10000 , left side = 4.25176165941288e-8
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58485067484452e-3
n = 20000 , left side = 1.06294040791433e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75605570419366e-4
```

$$x^3$$

```
n = 10000 , left side = 6.37764248911932e-8
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58482941603622e-3
n = 20000 , left side = 1.59441061742260e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75600255717271e-4
```

$$x^4$$

```
n = 10000 , left side = 6.37764321631540e-8
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58482941602895e-3
n = 20000 , left side = 1.59441067154598e-8
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75600255716730e-4
```

$$x^{10}$$

```
n = 10000 , left side = 7.47382359559540e-9
          1/n^(7/10) = 1.58489319246111e-3
          difference = 1.58488571863752e-3
n = 20000 , left side = 1.86845143632271e-9
          1/n^(7/10) = 9.75616199823445e-4
          difference = 9.75614331372009e-4
```

```
A = e, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 2.93119100095773e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28026153479236e-2
n = 20000 , left side = 1.46633227955384e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11030282773050e-2
```

$$x$$

```
n = 10000 , left side = 5.54517744447480e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.25412167035719e-2
n = 20000 , left side = 2.77258872223851e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.09724026330365e-2
```

$$x^2$$

```
n = 10000 , left side = 5.55354946611741e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.25403795014076e-2
n = 20000 , left side = 2.77468172764805e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.09721933324956e-2
```

$$x^3$$

```
n = 10000 , left side = 4.17145163294580e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.26785892847248e-2
n = 20000 , left side = 2.08258236443520e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.10414032688169e-2
```

$$x^4$$

```
n = 10000 , left side = 2.78516781141866e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28172176668775e-2
n = 20000 , left side = 1.38943649991952e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11107178552684e-2
```

$$x^{10}$$

```
n = 10000 , left side = 1.09785825237357e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30847558654956e-2
n = 20000 , left side = 5.45212716726844e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12442093780931e-2
```

```
--------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46493212512810e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29492412355065e-2
n = 20000 , left side = 7.33000327554079e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11763614725050e-2
```

$$x$$

```
n = 10000 , left side = 2.77258872223962e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28184755757954e-2
n = 20000 , left side = 1.38629436112425e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11110320691480e-2
```

$$x^2$$

```
n = 10000 , left side = 2.77865456941029e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28178689910783e-2
n = 20000 , left side = 1.38781082291317e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11108804229691e-2
```

$$x^3$$

```
n = 10000 , left side = 2.08854493159272e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28868799548601e-2
n = 20000 , left side = 1.04199604092359e-4
```

```
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11454619011680e-2
```

$$x^4$$

```
        n = 10000 , left side = 1.39540238443522e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.29561942095758e-2
        n = 20000 , left side = 6.95423028586745e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11801192024017e-2
```

$$x^{10}$$

```
        n = 10000 , left side = 5.52227630143723e-6
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30902121717179e-2
        n = 20000 , left side = 2.73431715163124e-6
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12469271881087e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10000 , left side = 1.86859671735817e-7
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30955475883476e-2
        n = 20000 , left side = 4.67148029148490e-8
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496147904575e-2
```

$$x$$

```
        n = 10000 , left side = 0.000000000000000e0
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30957344480193e-2
        n = 20000 , left side = 0.000000000000000e0
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496615052604e-2
```

$$x^2$$

```
        n = 10000 , left side = 5.29712234798030e-7
                1/n^(3/10) = 6.30957344480193e-2
```

```
          difference = 6.30952047357845e-2
n = 20000 , left side = 1.32428058741141e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12495290772016e-2
```

$$x^3$$

```
n = 10000 , left side = 7.94568352030511e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30949398796673e-2
n = 20000 , left side = 1.98642088028445e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12494628631723e-2
```

$$x^4$$

```
n = 10000 , left side = 7.94569526285649e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30949398784930e-2
n = 20000 , left side = 1.98642161552964e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12494628630988e-2
```

$$x^{10}$$

```
n = 10000 , left side = 9.31173321178178e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956413306872e-2
n = 20000 , left side = 2.32786095991869e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496382266508e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46632346878950e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29491021011404e-2
n = 20000 , left side = 7.33348323105343e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11763266729498e-2
```

$$x$$

```
n = 10000 , left side = 2.77258872223962e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28184755757954e-2
n = 20000 , left side = 1.38629436111981e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11110320691484e-2
```

$$x^2$$

```
n = 10000 , left side = 2.77470672764790e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28182637752545e-2
n = 20000 , left side = 1.38682386247202e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11109791190132e-2
```

$$x^3$$

```
n = 10000 , left side = 2.08261988522945e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.28874724594964e-2
n = 20000 , left side = 1.04051518979742e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11456099862806e-2
```

$$x^4$$

```
n = 10000 , left side = 1.38947404154002e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29567870438653e-2
n = 20000 , left side = 6.93941766537476e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11802673286066e-2
```

$$x^{10}$$

```
n = 10000 , left side = 5.45256858161774e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30902818794377e-2
n = 20000 , left side = 2.71692949530542e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12469445757651e-2
```

```
-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.32991512725212e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30224352967468e-2
n = 20000 , left side = 3.66631610068113e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12129983442536e-2
```

$$x$$

```
n = 10000 , left side = 1.38629436112758e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29571050119066e-2
n = 20000 , left side = 6.93147180563791e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803467872040e-2
```

$$x^2$$

```
n = 10000 , left side = 1.38783582291191e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29569508657281e-2
n = 20000 , left side = 6.93532546008901e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803082506595e-2
```

$$x^3$$

```
n = 10000 , left side = 1.04203355132004e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29915310928873e-2
n = 20000 , left side = 5.20438507067011e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11976176545537e-2
```

$$x^4$$

```
n = 10000 , left side = 6.95460549745980e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30261883930447e-2
n = 20000 , left side = 3.47151785258792e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149463267345e-2
```

$$x^{10}$$

```
          n = 10000 , left side = 2.73475758816180e-6
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30929996904312e-2
          n = 20000 , left side = 1.36058399615932e-6
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12483009212642e-2


-------------------------------------------------------------------------------
A = e, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 4.75966934754268e-8
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30956868513259e-2
          n = 20000 , left side = 1.18991658748513e-8
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496496060945e-2
```

$$x$$

```
          n = 10000 , left side = 1.11022302462516e-16
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30957344480192e-2
          n = 20000 , left side = 0.000000000000000e0
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496615052604e-2
```

$$x^2$$

```
          n = 10000 , left side = 1.34928058670436e-7
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30955995199607e-2
          n = 20000 , left side = 3.37320148480202e-8
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496277732455e-2
```

$$x^3$$

```
          n = 10000 , left side = 2.02392088061165e-7
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.30955320559313e-2
          n = 20000 , left side = 5.05980219667190e-8
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496109072384e-2
```

$$x^4$$

```
n = 10000 , left side = 2.02392163403675e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955320558559e-2
n = 20000 , left side = 5.05980267545558e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496109072336e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.37180706708865e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957107299487e-2
n = 20000 , left side = 5.92947235603970e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496555757880e-2
```

A = e, Power = 3/10, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.33339519942700e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30224004960251e-2
n = 20000 , left side = 3.66718634819962e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12129896417784e-2
```

$$x$$

```
n = 10000 , left side = 1.38629438314997e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29571050097043e-2
n = 20000 , left side = 6.93147191574983e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803467861029e-2
```

$$x^2$$

```
n = 10000 , left side = 1.38684888448870e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29570495595705e-2
n = 20000 , left side = 6.93285816909528e-5
```

```
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11803329235694e-2
```

$$x^3$$

```
n = 10000 , left side = 1.04055271669928e-4
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.29916791763494e-2
n = 20000 , left side = 5.20068353848657e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.11976546698755e-2
```

$$x^4$$

```
n = 10000 , left side = 6.93979298337921e-5
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30263365181855e-2
n = 20000 , left side = 3.46781578337979e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12149833474266e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.71736996742536e-6
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30930170780519e-2
n = 20000 , left side = 1.35624196148263e-6
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12483052632989e-2
```

A = e, Power = 3/10, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 3.66622776548642e-5
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30590721703645e-2
n = 20000 , left side = 1.83347566419245e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12313267486185e-2
```

$$x$$

```
n = 10000 , left side = 6.93147149062323e-5
                1/n^(3/10) = 6.30957344480193e-2
```

```
          difference = 6.30264197331131e-2
n = 20000 , left side = 3.46573574532272e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12150041478071e-2
```

$$x^2$$

```
n = 10000 , left side = 6.93557514500620e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30263786965693e-2
n = 20000 , left side = 3.46676165891013e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149938886713e-2
```

$$x^3$$

```
n = 10000 , left side = 5.20475988625424e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30436868491568e-2
n = 20000 , left side = 2.60084077771117e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12236530974833e-2
```

$$x^4$$

```
n = 10000 , left side = 3.47189280094640e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30610155200099e-2
n = 20000 , left side = 1.73440694105353e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12323174358498e-2
```

$$x^{10}$$

```
n = 10000 , left side = 1.36102387752720e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30943734241418e-2
n = 20000 , left side = 6.78705799480542e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12489827994609e-2
```

A = e, Power = 3/10, lamda = 1, q = 1

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.27810565464515e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957216669628e-2
n = 20000 , left side = 3.19526338721232e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496583099970e-2
```

x

```
n = 10000 , left side = 1.66533453693773e-16
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957344480192e-2
n = 20000 , left side = 0.000000000000000e0
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496615052604e-2
```

x^2

```
n = 10000 , left side = 3.62320168312280e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956982160025e-2
n = 20000 , left side = 9.05800418005143e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496524472562e-2
```

x^3

```
n = 10000 , left side = 5.43480251358197e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956800999942e-2
n = 20000 , left side = 1.35870063533439e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496479182540e-2
```

x^4

```
n = 10000 , left side = 5.43480303955013e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956800999889e-2
n = 20000 , left side = 1.35870276002370e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496479182328e-2
```

x^{10}

```
n = 10000 , left side = 6.36892622451687e-9
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957280790931e-2
```

```
          n = 20000 , left side = 1.59222753558230e-9
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.12496599130328e-2


-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 2.93119100095773e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.70688089990423e-3
          n = 20000 , left side = 1.46633227955384e-4
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 6.92443458391009e-3
```

$$x$$

```
          n = 10000 , left side = 5.54517744447480e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.44548225555252e-3
          n = 20000 , left side = 2.77258872223851e-4
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 6.79380893964162e-3
```

$$x^2$$

```
          n = 10000 , left side = 5.55354946611741e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.44464505338826e-3
          n = 20000 , left side = 2.77468172764805e-4
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 6.79359963910067e-3
```

$$x^3$$

```
          n = 10000 , left side = 4.17145163294580e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.58285483670542e-3
          n = 20000 , left side = 2.08258236443520e-4
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 6.86280957542195e-3
```

$$x^4$$

```
n = 10000 , left side = 2.78516781141866e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72148321885813e-3
n = 20000 , left side = 1.38943649991952e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93212416187352e-3
```

$$x^{10}$$

```
n = 10000 , left side = 1.09785825237357e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.98902141747626e-3
n = 20000 , left side = 5.45212716726844e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06561568469821e-3
```

A = e, Power = 1/2, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46493212512810e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.85350678748719e-3
n = 20000 , left side = 7.33000327554079e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99776777911007e-3
```

$$x$$

```
n = 10000 , left side = 2.77258872223962e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72274112777604e-3
n = 20000 , left side = 1.38629436112425e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93243837575305e-3
```

$$x^2$$

```
n = 10000 , left side = 2.77865456941029e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72213454305897e-3
n = 20000 , left side = 1.38781082291317e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93228672957416e-3
```

$$x^3$$

```
n = 10000 , left side = 2.08854493159272e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.79114550684073e-3
n = 20000 , left side = 1.04199604092359e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.96686820777312e-3
```

$$x^4$$

```
n = 10000 , left side = 1.39540238443522e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.86045976155648e-3
n = 20000 , left side = 6.95423028586745e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.00152550900680e-3
```

$$x^{10}$$

```
n = 10000 , left side = 5.52227630143723e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99447772369856e-3
n = 20000 , left side = 2.73431715163124e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06833349471384e-3
```

A = e, Power = 1/2, lamda = 1/4, q = 1

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.86859671735817e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99981314032826e-3
n = 20000 , left side = 4.67148029148490e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07102109706256e-3
```

$$x$$

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.00000000000000e-2
          difference = 1.00000000000000e-2
n = 20000 , left side = 0.000000000000000e0
```

```
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106781186548e-3
```

$$x^2$$

```
n = 10000 , left side = 5.29712234798030e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99947028776520e-3
n = 20000 , left side = 1.32428058741141e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07093538380673e-3
```

$$x^3$$

```
n = 10000 , left side = 7.94568352030511e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99920543164797e-3
n = 20000 , left side = 1.98642088028445e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07086916977745e-3
```

$$x^4$$

```
n = 10000 , left side = 7.94569526285649e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99920543047371e-3
n = 20000 , left side = 1.98642161552964e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07086916970392e-3
```

$$x^{10}$$

```
n = 10000 , left side = 9.31173321178178e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99990688266788e-3
n = 20000 , left side = 2.32786095991869e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07104453325588e-3
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46632346878950e-4
          1/n^(1/2) = 1.00000000000000e-2
```

```
          difference = 9.85336765312105e-3
n = 20000 , left side = 7.33348323105343e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99773297955494e-3
```

x

```
n = 10000 , left side = 2.77258872223962e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72274112777604e-3
n = 20000 , left side = 1.38629436111981e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93243837575349e-3
```

x^2

```
n = 10000 , left side = 2.77470672764790e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72252932723521e-3
n = 20000 , left side = 1.38682386247202e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93238542561827e-3
```

x^3

```
n = 10000 , left side = 2.08261988522945e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.79173801147705e-3
n = 20000 , left side = 1.04051518979742e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.96701629288573e-3
```

x^4

```
n = 10000 , left side = 1.38947404154002e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.86105259584600e-3
n = 20000 , left side = 6.93941766537476e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.00167363521173e-3
```

x^{10}

```
n = 10000 , left side = 5.45256858161774e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99454743141838e-3
n = 20000 , left side = 2.71692949530542e-6
          1/n^(1/2) = 7.07106781186548e-3
```

```
                    difference = 7.06835088237017e-3


-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 7.32991512725212e-5
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.92670084872748e-3
          n = 20000 , left side = 3.66631610068113e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 7.03440465085866e-3
```

$$x$$

```
          n = 10000 , left side = 1.38629436112758e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.86137056388724e-3
          n = 20000 , left side = 6.93147180563791e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 7.00175309380910e-3
```

$$x^2$$

```
          n = 10000 , left side = 1.38783582291191e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.86121641770881e-3
          n = 20000 , left side = 6.93532546008901e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 7.00171455726459e-3
```

$$x^3$$

```
          n = 10000 , left side = 1.04203355132004e-4
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.89579664486800e-3
          n = 20000 , left side = 5.20438507067011e-5
                    1/n^(1/2) = 7.07106781186548e-3
                    difference = 7.01902396115877e-3
```

$$x^4$$

```
          n = 10000 , left side = 6.95460549745980e-5
                    1/n^(1/2) = 1.00000000000000e-2
                    difference = 9.93045394502540e-3
```

```
n = 20000 , left side = 3.47151785258792e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03635263333960e-3
```

$$x^{10}$$

```
n = 10000 , left side = 2.73475758816180e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99726524241184e-3
n = 20000 , left side = 1.36058399615932e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06970722786932e-3
```

```
-------------------------------------------------------------------------------
A = e, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 4.75966934754268e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99995240330652e-3
n = 20000 , left side = 1.18991658748513e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07105591269960e-3
```

$$x$$

```
n = 10000 , left side = 1.11022302462516e-16
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99999999999989e-3
n = 20000 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106781186548e-3
```

$$x^2$$

```
n = 10000 , left side = 1.34928058670436e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99986507194133e-3
n = 20000 , left side = 3.37320148480202e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07103407985063e-3
```

$$x^3$$

```
n = 10000 , left side = 2.02392088061165e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99979760791194e-3
n = 20000 , left side = 5.05980219667190e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07101721384351e-3
```

$$x^4$$

```
n = 10000 , left side = 2.02392163403675e-7
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99979760783660e-3
n = 20000 , left side = 5.05980267545558e-8
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07101721383872e-3
```

$$x^{10}$$

```
n = 10000 , left side = 2.37180706708865e-8
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99997628192933e-3
n = 20000 , left side = 5.92947235603970e-9
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07106188239312e-3
```

A = e, Power = 1/2, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.33339519942700e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.92666604800573e-3
n = 20000 , left side = 3.66718634819962e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03439594838348e-3
```

$$x$$

```
n = 10000 , left side = 1.38629438314997e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.86137056168500e-3
n = 20000 , left side = 6.93147191574983e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.00175309270798e-3
```

$$x^2$$

```
n = 10000 , left side = 1.38684888448870e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.86131511155113e-3
n = 20000 , left side = 6.93285816909528e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.00173923017452e-3
```

$$x^3$$

```
n = 10000 , left side = 1.04055271669928e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.89594472833007e-3
n = 20000 , left side = 5.20068353848657e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.01906097648061e-3
```

$$x^4$$

```
n = 10000 , left side = 6.93979298337921e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.93060207016621e-3
n = 20000 , left side = 3.46781578337979e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03638965403168e-3
```

$$x^{10}$$

```
n = 10000 , left side = 2.71736996742536e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99728263003257e-3
n = 20000 , left side = 1.35624196148263e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06971156990399e-3
```

A = e, Power = 1/2, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 3.66622776548642e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.96333772234514e-3
n = 20000 , left side = 1.83347566419245e-5
```

```
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.05273305522355e-3
```

x

```
n = 10000 , left side = 6.93147149062323e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.93068528509377e-3
n = 20000 , left side = 3.46573574532272e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03641045441225e-3
```

x^2

```
n = 10000 , left side = 6.93557514500620e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.93064424854994e-3
n = 20000 , left side = 3.46676165891013e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.03640019527637e-3
```

x^3

```
n = 10000 , left side = 5.20475988625424e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.94795240113746e-3
n = 20000 , left side = 2.60084077771117e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.04505940408836e-3
```

x^4

```
n = 10000 , left side = 3.47189280094640e-5
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.96528107199054e-3
n = 20000 , left side = 1.73440694105353e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.05372374245494e-3
```

x^{10}

```
n = 10000 , left side = 1.36102387752720e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99863897612247e-3
n = 20000 , left side = 6.78705799480542e-7
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.07038910606599e-3
```

10 Real-valued neural network approximation based on the q-deformed and λ-parametrized Hyperbolic Tangent - introduction

We present in here some of the background and the main result that was proven in the monograph [Parametrized, Deformed and General Neural Networks, Springer, Heidelberg, New York, 2023], in Chapter 18.

The **activation function** [see monograph, formula 18.1] used for this part is defined as follows (note, in the code below, we called this function phi(x)):

$$g_{q,\lambda}(x) := \frac{e^{\lambda x} - qe^{-\lambda x}}{e^{\lambda x} + qe^{-\lambda x}}, \ \forall x \in \mathbb{R}, \ where \ q, \lambda > 0. \tag{9}$$

Then [see monograph, formula 18.9], we present the **density function** (which, in the SageMath code below this was named G(x)):

$$M_{q,\lambda}(x) := \frac{1}{4}(g_{q,\lambda}(x+1) - g_{q,\lambda}(x-1)) > 0, \ \forall x \in \mathbb{R}, \ where \ q, \ \lambda > 0. \tag{10}$$

Lastly, [see monograph, formula 18.29], we give the real-valued **linear neural network operators**:

$$H_n(f,x) := \frac{\sum_{k=\lceil na \rceil}^{\lfloor nb \rfloor} f(\frac{k}{n}) M_{q,\lambda}(nx-k)}{\sum_{k=\lceil na \rceil}^{\lfloor nb \rfloor} M_{q,\lambda}(nx-k)}, \ where \ f \in C([a,b]), \ x \in [a,b], \ q > 0, \ q \neq 1. \tag{11}$$

It was shown [see monograph, Theorem 18.9], that:

$$\lim_{n \to \infty} H_n(f) = f, \tag{12}$$

pointwise and uniformly.

Next, we present our computational results using SageMath. Please note that we removed several of the results generated by the code below.

11 Real-valued neural network approximation based on the q-deformed and λ-parametrized Hyperbolic Tangent - part 1

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
               ␣
 ↪print("-------------------------------------------------------------------------------")
                print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
 ↪str(lamda) + ",  q = " + str(q))
               ␣
 ↪print("-------------------------------------------------------------------------------")

                #the activation function
                phi(x) =  (e^(lamda*x)-q*e^(-lamda*x))/
 ↪(e^(lamda*x)+q*e^(-lamda*x))   #formula  18.1

                #
                G(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 18.9

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [10, 20, 50, 100, 200, 500]:
```

```
                        #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                        #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(L(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 1.10269377456684e-1
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 3.90917856170588e-1
          n = 20 , left side = 7.76237576737798e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.29466773863125e-1
          n = 50 , left side = 3.60961153613114e-2
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.73153379349680e-1
          n = 100 , left side = 1.88410272392819e-2
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 2.32347615911676e-1
          n = 200 , left side = 9.61343382830937e-3
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 1.94415143508528e-1
          n = 500 , left side = 3.89095422715457e-3
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.51100944527679e-1
```

$$\cos(x)$$

```
          n = 10 , left side = 2.51869405006841e-1
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 2.49317828620431e-1
          n = 20 , left side = 1.14542456854608e-1
```

```
                1/n^(3/10) = 4.07090531536904e-1
                difference = 2.92548074682297e-1
        n = 50 , left side = 4.20732317898758e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.67176262921116e-1
        n = 100 , left side = 2.03378378667151e-2
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.30850805284243e-1
        n = 200 , left side = 9.98779497231417e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.94040782364523e-1
        n = 500 , left side = 3.95085911348803e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.51041039641346e-1


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 3.95100600139320e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.61677173613340e-1
        n = 20 , left side = 3.46988342396717e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.72391697297233e-1
        n = 50 , left side = 1.73741914965689e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.91875303214423e-1
        n = 100 , left side = 9.25093740382410e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.41937705747134e-1
        n = 200 , left side = 4.76419447265530e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.99264382864182e-1
        n = 500 , left side = 1.93866173914381e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53053237015690e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.43310623580410e-1
                1/n^(3/10) = 5.01187233627272e-1
                difference = 3.57876610046862e-1
        n = 20 , left side = 6.16155530779091e-2
                1/n^(3/10) = 4.07090531536904e-1
```

```
                 difference = 3.45474978458995e-1
        n = 50 , left side = 2.17255095716978e-2
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 2.87523985139294e-1
        n = 100 , left side = 1.03403776602996e-2
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.40848265490658e-1
        n = 200 , left side = 5.03665536910569e-3
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 1.98991921967731e-1
        n = 500 , left side = 1.98226000171708e-3
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.53009638753117e-1


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 4.55658979518567e-2
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 4.55621335675416e-1
        n = 20 , left side = 1.17886898348851e-2
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 3.95301841702019e-1
        n = 50 , left side = 1.90462319911511e-3
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 3.07344871511877e-1
        n = 100 , left side = 4.76820716817761e-4
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.50711822434140e-1
        n = 200 , left side = 1.19246801639550e-4
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 2.03909330535197e-1
        n = 500 , left side = 1.90813536956602e-5
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.54972817401138e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 4.55601836086842e-2
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 4.55627050018588e-1
        n = 20 , left side = 1.17886897702854e-2
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 3.95301841766619e-1
```

```
n = 50 , left side = 1.90462319911577e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07344871511876e-1
n = 100 , left side = 4.76820716817428e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50711822434141e-1
n = 200 , left side = 1.19246801639439e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909330535198e-1
n = 500 , left side = 1.90813536956602e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972817401138e-1


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.66430508778090e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.24544182749463e-1
n = 20 , left side = 4.38693273663759e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.63221204170528e-1
n = 50 , left side = 1.88047297835471e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.90444764927445e-1
n = 100 , left side = 9.60447473250947e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41584168418449e-1
n = 200 , left side = 4.85201986681627e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99176557470021e-1
n = 500 , left side = 1.95265780521114e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53039240949623e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.15283010872480e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.85904222754792e-1
n = 20 , left side = 5.36357377250527e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.53454793811852e-1
n = 50 , left side = 2.03721756047669e-2
```

```
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.88877319106225e-1
        n = 100 , left side = 9.99650884011438e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.41192134310844e-1
        n = 200 , left side = 4.95003918172598e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 1.99078538155111e-1
        n = 500 , left side = 1.96834138039348e-3
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.53023557374440e-1


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 3.37717704676072e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.67415463159665e-1
        n = 20 , left side = 2.07753148869365e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.86315216649968e-1
        n = 50 , left side = 9.21511967883226e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.00034375032159e-1
        n = 100 , left side = 4.75529633802174e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.46433346812936e-1
        n = 200 , left side = 2.41425898359460e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.01614318353242e-1
        n = 500 , left side = 9.74447341997586e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54017451412836e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 6.24222476166085e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.38764986010664e-1
        n = 20 , left side = 2.80065121964507e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.79084019340454e-1
        n = 50 , left side = 1.03752156077472e-2
                1/n^(3/10) = 3.09249494710992e-1
```

```
                 difference = 2.98874279103244e-1
        n = 100 , left side = 5.04543146629388e-3
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.46143211684664e-1
        n = 200 , left side = 2.48679971416887e-3
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 2.01541777622668e-1
        n = 500 , left side = 9.86054169944683e-4
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.54005844584889e-1


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.26576588370484e-2
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 4.88529574790224e-1
        n = 20 , left side = 3.19289527212985e-3
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 4.03897636264775e-1
        n = 50 , left side = 5.12151444058917e-4
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 3.08737343266933e-1
        n = 100 , left side = 1.28084179052301e-4
                 1/n^(3/10) = 2.51188643150958e-1
                 difference = 2.51060558971906e-1
        n = 200 , left side = 3.20238618125579e-5
                 1/n^(3/10) = 2.04028577336837e-1
                 difference = 2.03996553475024e-1
        n = 500 , left side = 5.12400106722488e-6
                 1/n^(3/10) = 1.54991898754834e-1
                 difference = 1.54986774753766e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 1.26576548275704e-2
                 1/n^(3/10) = 5.01187233627272e-1
                 difference = 4.88529578799702e-1
        n = 20 , left side = 3.19289294996883e-3
                 1/n^(3/10) = 4.07090531536904e-1
                 difference = 4.03897638586936e-1
        n = 50 , left side = 5.12152389308573e-4
                 1/n^(3/10) = 3.09249494710992e-1
                 difference = 3.08737342321683e-1
```

```
          n = 100 , left side = 1.28084061290612e-4
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 2.51060559089667e-1
          n = 200 , left side = 3.20239758674346e-5
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 2.03996553360970e-1
          n = 500 , left side = 5.12391080254027e-6
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.54986774844031e-1


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 4.29282034779491e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.58259030149323e-1
          n = 20 , left side = 2.30286683697076e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.84061863167197e-1
          n = 50 , left side = 9.56745400404757e-3
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.99682040706944e-1
          n = 100 , left side = 4.84538571465232e-3
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 2.46343257436306e-1
          n = 200 , left side = 2.43500798502960e-3
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 2.01593569351807e-1
          n = 500 , left side = 9.78230233303456e-4
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.54013668521530e-1
```

$$\cos(x)$$

```
          n = 10 , left side = 5.44419628451549e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.46745270782117e-1
          n = 20 , left side = 2.59171447278922e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.81173386809012e-1
          n = 50 , left side = 1.00304303028137e-2
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.99219064408178e-1
          n = 100 , left side = 4.96112082798739e-3
```

```
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.46227522322971e-1
        n = 200 , left side = 2.46392751821078e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.01564649818626e-1
        n = 500 , left side = 9.82856796759912e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54009041958074e-1


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 1.98858419604222e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.81301391666850e-1
        n = 20 , left side = 1.11111242904842e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.95979407246420e-1
        n = 50 , left side = 4.71676040228819e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.04532734308704e-1
        n = 100 , left side = 2.40386308996299e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.48784780060995e-1
        n = 200 , left side = 1.21454789680442e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.02814029440033e-1
        n = 500 , left side = 4.88452065581013e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54503446689253e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 2.88791443525872e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.72308089274685e-1
        n = 20 , left side = 1.33664407456531e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.93724090791251e-1
        n = 50 , left side = 5.07733367488394e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.04172161036108e-1
        n = 100 , left side = 2.49412468567678e-3
                1/n^(3/10) = 2.51188643150958e-1
```

```
                difference = 2.48694518465281e-1
        n = 200 , left side = 1.23708851068816e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.02791488826149e-1
        n = 500 , left side = 4.92063839226731e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54499834915607e-1


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 4.09324613380091e-3
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.97093987493471e-1
        n = 20 , left side = 1.03161560946519e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.06058915927439e-1
        n = 50 , left side = 1.58852765311801e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.09090641945680e-1
        n = 100 , left side = 4.13962851463223e-5
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51147246865812e-1
        n = 200 , left side = 9.67248590255654e-6
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.04018904850934e-1
        n = 500 , left side = 2.07035881660822e-6
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54989828396017e-1
```

$$\cos(x)$$

```
        n = 10 , left side = 4.05635916216029e-3
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.97130874465112e-1
        n = 20 , left side = 1.00937393504252e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.06081157601862e-1
        n = 50 , left side = 1.67976724238628e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.09081517986753e-1
        n = 100 , left side = 4.02584365390979e-5
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51148384714419e-1
```

```
          n = 200 , left side = 1.07750350520908e-5
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 2.04017802301785e-1
          n = 500 , left side = 1.19782555663139e-6
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.54990700929277e-1


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 1.10269377456684e-1
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 2.05958388560154e-1
          n = 20 , left side = 7.76237576737798e-2
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 1.45983040076199e-1
          n = 50 , left side = 3.60961153613114e-2
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.05325240875998e-1
          n = 100 , left side = 1.88410272392819e-2
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 8.11589727607181e-2
          n = 200 , left side = 9.61343382830937e-3
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 6.10972442903454e-2
          n = 500 , left side = 3.89095422715457e-3
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.08304053228412e-2
```

$$\cos(x)$$

```
          n = 10 , left side = 2.51869405006841e-1
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 6.43583610099968e-2
          n = 20 , left side = 1.14542456854608e-1
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 1.09064340895371e-1
          n = 50 , left side = 4.20732317898758e-2
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 9.93481244474337e-2
          n = 100 , left side = 2.03378378667151e-2
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 7.96621621332849e-2
          n = 200 , left side = 9.98779497231417e-3
```

```
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.07228831463406e-2
        n = 500 , left side = 3.95085911348803e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.07705004365078e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 3.95100600139320e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.76717706002906e-1
        n = 20 , left side = 3.46988342396717e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.88907963510307e-1
        n = 50 , left side = 1.73741914965689e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.24047164740741e-1
        n = 100 , left side = 9.25093740382410e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.07490625961759e-2
        n = 200 , left side = 4.76419447265530e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.59464836459994e-2
        n = 500 , left side = 1.93866173914381e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27826978108520e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 1.43310623580410e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.72917142436428e-1
        n = 20 , left side = 6.16155530779091e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.61991244672070e-1
        n = 50 , left side = 2.17255095716978e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.19695846665612e-1
        n = 100 , left side = 1.03403776602996e-2
                1/n^(1/2) = 1.00000000000000e-1
                difference = 8.96596223397004e-2
        n = 200 , left side = 5.03665536910569e-3
                1/n^(1/2) = 7.07106781186548e-2
```

```
                difference = 6.56740227495491e-2
        n = 500 , left side = 1.98226000171708e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.27390995482787e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 10 , left side = 4.55658979518567e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.70661868064981e-1
        n = 20 , left side = 1.17886898348851e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.11818107915094e-1
        n = 50 , left side = 1.90462319911511e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39516733038194e-1
        n = 100 , left side = 4.76820716817761e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.95231792831822e-2
        n = 200 , left side = 1.19246801639550e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05914313170152e-2
        n = 500 , left side = 1.90813536956602e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47022781963001e-2
```

$$\cos(x)$$

```
        n = 10 , left side = 4.55601836086842e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.70667582408154e-1
        n = 20 , left side = 1.17886897702854e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.11818107979694e-1
        n = 50 , left side = 1.90462319911577e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.39516733038194e-1
        n = 100 , left side = 4.76820716817428e-4
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.95231792831826e-2
        n = 200 , left side = 1.19246801639439e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.05914313170153e-2
```

```
          n = 500 , left side = 1.90813536956602e-5
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.47022781963001e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 7.66430508778090e-2
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 2.39584715139029e-1
          n = 20 , left side = 4.38693273663759e-2
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 1.79737470383603e-1
          n = 50 , left side = 1.88047297835471e-2
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.22616626453762e-1
          n = 100 , left side = 9.60447473250947e-3
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.03955252674905e-2
          n = 200 , left side = 4.85201986681627e-3
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 6.58586582518385e-2
          n = 500 , left side = 1.95265780521114e-3
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.27687017447846e-2
```

$$\cos(x)$$

```
          n = 10 , left side = 1.15283010872480e-1
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 2.00944755144358e-1
          n = 20 , left side = 5.36357377250527e-2
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 1.69971060024926e-1
          n = 50 , left side = 2.03721756047669e-2
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.21049180632543e-1
          n = 100 , left side = 9.99650884011438e-3
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.00034911598856e-2
          n = 200 , left side = 4.95003918172598e-3
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 6.57606389369288e-2
          n = 500 , left side = 1.96834138039348e-3
```

```
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.27530181696023e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 3.37717704676072e-2
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 2.82455995549231e-1
          n = 20 , left side = 2.07753148869365e-2
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 2.02831482863042e-1
          n = 50 , left side = 9.21511967883226e-3
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.32206236558477e-1
          n = 100 , left side = 4.75529633802174e-3
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.52447036619783e-2
          n = 200 , left side = 2.41425898359460e-3
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 6.82964191350602e-2
          n = 500 , left side = 9.74447341997586e-4
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.37469122079982e-2
```

$$\cos(x)$$

```
          n = 10 , left side = 6.24222476166085e-2
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 2.53805518400229e-1
          n = 20 , left side = 2.80065121964507e-2
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 1.95600285553528e-1
          n = 50 , left side = 1.03752156077472e-2
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.31046140629562e-1
          n = 100 , left side = 5.04543146629388e-3
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.49545685337061e-2
          n = 200 , left side = 2.48679971416887e-3
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 6.82238784044859e-2
          n = 500 , left side = 9.86054169944683e-4
                    1/n^(1/2) = 4.47213595499958e-2
```

```
                    difference = 4.37353053800511e-2


-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 1.26576588370484e-2
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 3.03570107179790e-1
          n = 20 , left side = 3.19289527212985e-3
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 2.20413902477849e-1
          n = 50 , left side = 5.12151444058917e-4
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.40909204793251e-1
          n = 100 , left side = 1.28084179052301e-4
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.98719158209477e-2
          n = 200 , left side = 3.20238618125579e-5
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 7.06786542568422e-2
          n = 500 , left side = 5.12400106722488e-6
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.47162355489286e-2
```

$$\cos(x)$$

```
          n = 10 , left side = 1.26576548275704e-2
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 3.03570111189268e-1
          n = 20 , left side = 3.19289294996883e-3
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 2.20413904800010e-1
          n = 50 , left side = 5.12152389308573e-4
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.40909203848001e-1
          n = 100 , left side = 1.28084061290612e-4
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.98719159387094e-2
          n = 200 , left side = 3.20239758674346e-5
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 7.06786541427873e-2
          n = 500 , left side = 5.12391080254027e-6
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.47162356391933e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.29282034779491e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.73299562538889e-1
n = 20 , left side = 2.30286683697076e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.00578129380271e-1
n = 50 , left side = 9.56745400404757e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31853902233262e-1
n = 100 , left side = 4.84538571465232e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.51546142853477e-2
n = 200 , left side = 2.43500798502960e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82756701336251e-2
n = 500 , left side = 9.78230233303456e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37431293166923e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.44419628451549e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.61785803171683e-1
n = 20 , left side = 2.59171447278922e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.97689653022087e-1
n = 50 , left side = 1.00304303028137e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31390925934496e-1
n = 100 , left side = 4.96112082798739e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.50388791720126e-2
n = 200 , left side = 2.46392751821078e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82467506004440e-2
n = 500 , left side = 9.82856796759912e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37385027532359e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.98858419604222e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96341924056416e-1
n = 20 , left side = 1.11111242904842e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.12495673459495e-1
n = 50 , left side = 4.71676040228819e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36704595835021e-1
n = 100 , left side = 2.40386308996299e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.75961369100370e-2
n = 200 , left side = 1.21454789680442e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.94961302218503e-2
n = 500 , left side = 4.88452065581013e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.42329074844148e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.88791443525872e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.87348621664251e-1
n = 20 , left side = 1.33664407456531e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.10240357004326e-1
n = 50 , left side = 5.07733367488394e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36344022562426e-1
n = 100 , left side = 2.49412468567678e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.75058753143232e-2
n = 200 , left side = 1.23708851068816e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.94735896079666e-2
n = 500 , left side = 4.92063839226731e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.42292957107691e-2
```

```
--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10 , left side = 4.09324613380091e-3
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 3.12134519883037e-1
          n = 20 , left side = 1.03161560946519e-3
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 2.22575182140514e-1
          n = 50 , left side = 1.58852765311801e-4
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.41262503471998e-1
          n = 100 , left side = 4.13962851463223e-5
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.99586037148537e-2
          n = 200 , left side = 9.67248590255654e-6
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 7.07010056327522e-2
          n = 500 , left side = 2.07035881660822e-6
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.47192891911792e-2
```

$$\cos(x)$$

```
          n = 10 , left side = 4.05635916216029e-3
                    1/n^(1/2) = 3.16227766016838e-1
                    difference = 3.12171406854678e-1
          n = 20 , left side = 1.00937393504252e-3
                    1/n^(1/2) = 2.23606797749979e-1
                    difference = 2.22597423814936e-1
          n = 50 , left side = 1.67976724238628e-4
                    1/n^(1/2) = 1.41421356237310e-1
                    difference = 1.41253379513071e-1
          n = 100 , left side = 4.02584365390979e-5
                    1/n^(1/2) = 1.00000000000000e-1
                    difference = 9.99597415634609e-2
          n = 200 , left side = 1.07750350520908e-5
                    1/n^(1/2) = 7.07106781186548e-2
                    difference = 7.06999030836027e-2
          n = 500 , left side = 1.19782555663139e-6
                    1/n^(1/2) = 4.47213595499958e-2
                    difference = 4.47201617244392e-2

--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.10269377456684e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.92568540402040e-2
n = 20 , left side = 7.76237576737798e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.51990449377992e-2
n = 50 , left side = 3.60961153613114e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.85765852964243e-2
n = 100 , left side = 1.88410272392819e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.09696898160678e-2
n = 200 , left side = 9.61343382830937e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.48929371186651e-2
n = 500 , left side = 3.89095422715457e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.01294601580975e-3
```

$$\cos(x)$$

```
n = 10 , left side = 2.51869405006841e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -5.23431735099532e-2
n = 20 , left side = 1.14542456854608e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.28034575697120e-3
n = 50 , left side = 4.20732317898758e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.25994688678600e-2
n = 100 , left side = 2.03378378667151e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.94728791886347e-2
n = 200 , left side = 9.98779497231417e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.45185759746603e-2
n = 500 , left side = 3.95085911348803e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.95304112947630e-3
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.95100600139320e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.60016171482956e-1
n = 20 , left side = 3.46988342396717e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.81239683719074e-2
n = 50 , left side = 1.73741914965689e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.72985091611668e-2
n = 100 , left side = 9.25093740382410e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.05597796515256e-2
n = 200 , left side = 4.76419447265530e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.97421764743192e-2
n = 500 , left side = 1.93866173914381e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09652385038205e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.43310623580410e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.62156079164780e-2
n = 20 , left side = 6.16155530779091e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.12072495336699e-2
n = 50 , left side = 2.17255095716978e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.29471910860379e-2
n = 100 , left side = 1.03403776602996e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.94703393950501e-2
n = 200 , left side = 5.03665536910569e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.94697155778688e-2
n = 500 , left side = 1.98226000171708e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09216402412472e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.55658979518567e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.53960333545031e-1
n = 20 , left side = 1.17886898348851e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11034112776694e-1
n = 50 , left side = 1.90462319911511e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.27680774586206e-2
n = 100 , left side = 4.76820716817761e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93338963385320e-2
n = 200 , left side = 1.19246801639550e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43871241453350e-2
n = 500 , left side = 1.90813536956602e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848188892687e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.55601836086842e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.53966047888204e-1
n = 20 , left side = 1.17886897702854e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11034112841294e-1
n = 50 , left side = 1.90462319911577e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.27680774586200e-2
n = 100 , left side = 4.76820716817428e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93338963385323e-2
n = 200 , left side = 1.19246801639439e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43871241453351e-2
n = 500 , left side = 1.90813536956602e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848188892687e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.66430508778090e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.22883180619079e-1
n = 20 , left side = 4.38693273663759e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.89534752452031e-2
n = 50 , left side = 1.88047297835471e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.58679708741887e-2
n = 100 , left side = 9.60447473250947e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.02062423228403e-2
n = 200 , left side = 4.85201986681627e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.96543510801582e-2
n = 500 , left side = 1.95265780521114e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09512424377532e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.15283010872480e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.42432206244079e-2
n = 20 , left side = 5.36357377250527e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.91870648865263e-2
n = 50 , left side = 2.03721756047669e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.43005250529689e-2
n = 100 , left side = 9.99650884011438e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.98142082152354e-2
n = 200 , left side = 4.95003918172598e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.95563317652485e-2
n = 500 , left side = 1.96834138039348e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09355588625708e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 3.37717704676072e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.65754461029281e-1
n = 20 , left side = 2.07753148869365e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02047487724643e-1
n = 50 , left side = 9.21511967883226e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.54575809789035e-2
n = 100 , left side = 4.75529633802174e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.50554207173280e-2
n = 200 , left side = 2.41425898359460e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20921119633799e-2
n = 500 , left side = 9.74447341997586e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19294529009667e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.24222476166085e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.37103983880279e-1
n = 20 , left side = 2.80065121964507e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.48162904151284e-2
n = 50 , left side = 1.03752156077472e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.42974850499885e-2
n = 100 , left side = 5.04543146629388e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.47652855890559e-2
n = 200 , left side = 2.48679971416887e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20195712328056e-2
n = 500 , left side = 9.86054169944683e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19178460730196e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.26576588370484e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.86868572659840e-1
n = 20 , left side = 3.19289527212985e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19629907339449e-1
n = 50 , left side = 5.12151444058917e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41605492136768e-2
n = 100 , left side = 1.28084179052301e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826328762974e-2
n = 200 , left side = 3.20238618125579e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44743470851619e-2
n = 500 , left side = 5.12400106722488e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987762418971e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.26576548275704e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.86868576669318e-1
n = 20 , left side = 3.19289294996883e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19629909661610e-1
n = 50 , left side = 5.12152389308573e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41605482684272e-2
n = 100 , left side = 1.28084061290612e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826329940591e-2
n = 200 , left side = 3.20239758674346e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44743469711071e-2
n = 500 , left side = 5.12391080254027e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987763321618e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.29282034779491e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.56598028018939e-1
n = 20 , left side = 2.30286683697076e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.97941342418714e-2
n = 50 , left side = 9.56745400404757e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.51052466536882e-2
n = 100 , left side = 4.84538571465232e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.49653313406974e-2
n = 200 , left side = 2.43500798502960e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20713629619449e-2
n = 500 , left side = 9.78230233303456e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19256700096609e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.44419628451549e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.45084268651733e-1
n = 20 , left side = 2.59171447278922e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.69056578836869e-2
n = 50 , left side = 1.00304303028137e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.46422703549221e-2
n = 100 , left side = 4.96112082798739e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.48495962273623e-2
n = 200 , left side = 2.46392751821078e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20424434287637e-2
n = 500 , left side = 9.82856796759912e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19210434462044e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.98858419604222e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79640389536466e-1
n = 20 , left side = 1.11111242904842e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11711678321095e-1
n = 50 , left side = 4.71676040228819e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.99559402554476e-2
n = 100 , left side = 2.40386308996299e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.74068539653867e-2
n = 200 , left side = 1.21454789680442e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.32918230501701e-2
n = 500 , left side = 4.88452065581013e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.24154481773833e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.88791443525872e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.70647087144301e-1
n = 20 , left side = 1.33664407456531e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.09456361865926e-1
n = 50 , left side = 5.07733367488394e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.95953669828518e-2
n = 100 , left side = 2.49412468567678e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.73165923696730e-2
n = 200 , left side = 1.23708851068816e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.32692824362863e-2
n = 500 , left side = 4.92063839226731e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.24118364037376e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/4*pi, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.09324613380091e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.95432985363087e-1
n = 20 , left side = 1.03161560946519e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21791187002114e-1
n = 50 , left side = 1.58852765311801e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.45138478924240e-2
n = 100 , left side = 4.13962851463223e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97693207702034e-2
n = 200 , left side = 9.67248590255654e-6
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44966984610719e-2
n = 500 , left side = 2.07035881660822e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29018298841477e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.05635916216029e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.95469872334728e-1
n = 20 , left side = 1.00937393504252e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21813428676537e-1
n = 50 , left side = 1.67976724238628e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.45047239334971e-2
n = 100 , left side = 4.02584365390979e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97704586188106e-2
n = 200 , left side = 1.07750350520908e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44955959119224e-2
n = 500 , left side = 1.19782555663139e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29027024174077e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 9.84826134043602e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.02704620222912e-1
n = 20 , left side = 2.61046861206299e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.80985845416275e-1
n = 50 , left side = 4.22645955857948e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.05023035152412e-1
n = 100 , left side = 1.05840494480935e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50130238206149e-1
n = 200 , left side = 2.64713303538500e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03763864033298e-1
n = 500 , left side = 4.23591513531996e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54949539603481e-1
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457694e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.46187995169579e-1
n = 20 , left side = 1.35881405538451e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.71209125998454e-1
n = 50 , left side = 5.52740754515297e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53975419259462e-1
n = 100 , left side = 2.77036411956434e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23485001955315e-1
n = 200 , left side = 1.38601618045097e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90168415532327e-1
n = 500 , left side = 5.54499938996761e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446899364866e-1
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486467e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.28631132978626e-1
n = 20 , left side = 1.90326036120039e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.88057927924901e-1
n = 50 , left side = 3.07684651802387e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06172648192968e-1
n = 100 , left side = 7.70350593050750e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50418292557907e-1
n = 200 , left side = 1.92658947488322e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03835918389349e-1
n = 500 , left side = 3.08286271140101e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54961070127720e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72544743619751e-1
n = 20 , left side = 6.81042176000301e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.38986313936874e-1
n = 50 , left side = 2.76476637677382e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81601830943254e-1
n = 100 , left side = 1.38531517342038e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37335491416754e-1
n = 200 , left side = 6.93024738450046e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97098329952337e-1
n = 500 , left side = 2.77251035146458e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219388403369e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492427e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.37175724978030e-1
n = 20 , left side = 1.66715291654219e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90419002371483e-1
n = 50 , left side = 2.69354395939936e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06555950751592e-1
n = 100 , left side = 6.74326324543451e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50514316826415e-1
n = 200 , left side = 1.68640444147772e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03859936892689e-1
n = 500 , left side = 2.69851091849738e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54964913645649e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.68331709595389e-4
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.00818901917677e-1
n = 20 , left side = 1.81936348617625e-7
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07090349600556e-1
n = 50 , left side = 0.000000000000000e0
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494710992e-1
n = 100 , left side = 4.77112203438756e-17
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 3.99794287396218e-18
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 8.20395785813390e-17
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.73218987411665e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.73865334886106e-1
n = 20 , left side = 6.90589468087810e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.00184636856026e-1
n = 50 , left side = 1.10835163775858e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08141143073233e-1
n = 100 , left side = 2.77209959256952e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50911433191701e-1
n = 200 , left side = 6.93101217303926e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03959267215107e-1
n = 500 , left side = 1.10899618147586e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54980808793019e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.35711685154782e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.65475548472490e-1
n = 20 , left side = 6.89464901817200e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.38144041355184e-1
n = 50 , left side = 2.77022557225578e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81547238988434e-1
n = 100 , left side = 1.38599886244430e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37328654526515e-1
n = 200 , left side = 6.93110233963076e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097474997206e-1
n = 500 , left side = 2.77256501313650e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219333741697e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377558e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.80928628589517e-1
n = 20 , left side = 5.11322907698697e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01977302459917e-1
n = 50 , left side = 8.20311672977692e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08429183038014e-1
n = 100 , left side = 2.05156512414151e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50983486638544e-1
n = 200 , left side = 5.12940438202047e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03977283293017e-1
n = 500 , left side = 8.20726742556399e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54983691487408e-1
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.33168075685853e-1
n = 20 , left side = 3.44939608010511e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72596570735853e-1
n = 50 , left side = 1.38524597520625e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95397034958929e-1
n = 100 , left side = 6.93016042367867e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44258482727279e-1
n = 200 , left side = 3.46557187207862e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00563005464758e-1
n = 500 , left side = 1.38628390798491e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53605614846849e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.83286775969330e-1
n = 20 , left side = 4.51543399532361e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.02575097541581e-1
n = 50 , left side = 7.24292150887096e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08525202560105e-1
n = 100 , left side = 1.81138319373497e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51007504831585e-1
n = 200 , left side = 4.52886594521917e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03983288677385e-1
n = 500 , left side = 7.24636777071908e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54984652387063e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523831611e-7
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.01187075757749e-1
n = 20 , left side = 8.57307872321585e-10
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07090530679597e-1
n = 50 , left side = 1.66778292572710e-10
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494544213e-1
n = 100 , left side = 1.61355749321499e-10
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188642989602e-1
n = 200 , left side = 1.41525527114055e-10
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577195311e-1
n = 500 , left side = 4.01468831931699e-11
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898714687e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 8.14417705162507e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.93043056575647e-1
n = 20 , left side = 2.04451572215358e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.05046015814751e-1
n = 50 , left side = 3.27307123230036e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08922187587762e-1
n = 100 , left side = 8.17942128127358e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51106848938145e-1
n = 200 , left side = 2.04561035900275e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04008121233247e-1
n = 500 , left side = 3.27470541416908e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54988624049420e-1
```

$$\cos(x)$$

```
n = 10 , left side = 6.88796875744184e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.32307546052854e-1
n = 20 , left side = 3.46106749496968e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72479856587208e-1
n = 50 , left side = 1.38657599904077e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95383734720584e-1
n = 100 , left side = 6.92779875289445e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44260844398064e-1
n = 200 , left side = 3.46437879098605e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00564198545851e-1
n = 500 , left side = 1.38664352198994e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53605255232844e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.36177783107461e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.94825455796198e-1
n = 20 , left side = 1.59327072888782e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.05497260808017e-1
n = 50 , left side = 2.55270681782438e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08994224029209e-1
n = 100 , left side = 6.37527543482230e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51124890396610e-1
n = 200 , left side = 1.59359198846909e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04012641416952e-1
n = 500 , left side = 2.55130565363082e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54989347449180e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.44617147652922e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.66725518861980e-1
n = 20 , left side = 1.72865571687706e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.89803974368134e-1
n = 50 , left side = 6.92555552990447e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.02323939181087e-1
n = 100 , left side = 3.46698227542804e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47721660875530e-1
n = 200 , left side = 1.73278247468734e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02295794862150e-1
n = 500 , left side = 6.92495905051582e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54299402849782e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 5.75819452524406e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.95429039102028e-1
n = 20 , left side = 1.44242808346062e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.05648103453444e-1
n = 50 , left side = 2.30930988249112e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09018563722743e-1
n = 100 , left side = 5.78328593896504e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51130810291568e-1
n = 200 , left side = 1.44542703056638e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04014123066531e-1
n = 500 , left side = 2.30995962646752e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54989588795207e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.17056957943215e-5
          1/n^(3/10) = 5.01187233627272e-1
          difference = 5.01155527931478e-1
n = 20 , left side = 8.21112944009224e-6
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07082320407464e-1
n = 50 , left side = 1.60967600009258e-6
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09247885034992e-1
n = 100 , left side = 1.55936473946361e-6
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51187083786219e-1
n = 200 , left side = 1.36805461285126e-6
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04027209282224e-1
n = 500 , left side = 3.88056297516311e-7
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991510698536e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 9.84826134043602e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.17745152612478e-1
n = 20 , left side = 2.61046861206299e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.97502111629349e-1
n = 50 , left side = 4.22645955857948e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.37194896678730e-1
n = 100 , left side = 1.05840494480935e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.89415950551907e-2
n = 200 , left side = 2.64713303538500e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04459648151163e-2
n = 500 , left side = 4.23591513531996e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46790003986426e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457694e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 6.12285275591444e-2
n = 20 , left side = 1.35881405538451e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 8.77253922115283e-2
n = 50 , left side = 5.52740754515297e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.61472807857798e-2
n = 100 , left side = 2.77036411956434e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.22963588043566e-2
n = 200 , left side = 1.38601618045097e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68505163141450e-2
n = 500 , left side = 5.54499938996761e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91763601600282e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486467e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.43671665368191e-1
n = 20 , left side = 1.90326036120039e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.04574194137975e-1
n = 50 , left side = 3.07684651802387e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38344509719286e-1
n = 100 , left side = 7.70350593050750e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.92296494069493e-2
n = 200 , left side = 1.92658947488322e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05180191711664e-2
n = 500 , left side = 3.08286271140101e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46905309228818e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.87585276009317e-1
n = 20 , left side = 6.81042176000301e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.55502580149949e-1
n = 50 , left side = 2.76476637677382e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13773692469571e-1
n = 100 , left side = 1.38531517342038e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61468482657962e-2
n = 200 , left side = 6.93024738450046e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37804307341543e-2
n = 500 , left side = 2.77251035146458e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19488491985312e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492427e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52216257367595e-1
n = 20 , left side = 1.66715291654219e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.06935268584557e-1
n = 50 , left side = 2.69354395939936e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38727812277910e-1
n = 100 , left side = 6.74326324543451e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.93256736754566e-2
n = 200 , left side = 1.68640444147772e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05420376745070e-2
n = 500 , left side = 2.69851091849738e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46943744408108e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.68331709595389e-4
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.15859434307243e-1
n = 20 , left side = 1.81936348617625e-7
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23606615813630e-1
n = 50 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356237310e-1
n = 100 , left side = 4.77112203438756e-17
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 3.99794287396218e-18
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 8.20395785813390e-17
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.73218987411665e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.88905867275671e-1
n = 20 , left side = 6.90589468087810e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.16700903069101e-1
n = 50 , left side = 1.10835163775858e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40313004599551e-1
n = 100 , left side = 2.77209959256952e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97227900407431e-2
n = 200 , left side = 6.93101217303926e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06413679969244e-2
n = 500 , left side = 1.10899618147586e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47102695881810e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.35711685154782e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.80516080862056e-1
n = 20 , left side = 6.89464901817200e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.54660307568259e-1
n = 50 , left side = 2.77022557225578e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13719100514752e-1
n = 100 , left side = 1.38599886244430e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61400113755570e-2
n = 200 , left side = 6.93110233963076e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37795757790240e-2
n = 500 , left side = 2.77256501313650e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487945368593e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377558e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.95969160979082e-1
n = 20 , left side = 5.11322907698697e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.18493568672992e-1
n = 50 , left side = 8.20311672977692e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40601044564332e-1
n = 100 , left side = 2.05156512414151e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97948434875859e-2
n = 200 , left side = 5.12940438202047e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06593840748345e-2
n = 500 , left side = 8.20726742556399e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47131522825702e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.48208608075418e-1
n = 20 , left side = 3.44939608010511e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.89112836948928e-1
n = 50 , left side = 1.38524597520625e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27568896485247e-1
n = 100 , left side = 6.93016042367867e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30698395763213e-2
n = 200 , left side = 3.46557187207862e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72451062465761e-2
n = 500 , left side = 1.38628390798491e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33350756420109e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.98327308358895e-1
n = 20 , left side = 4.51543399532361e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.19091363754655e-1
n = 50 , left side = 7.24292150887096e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40697064086422e-1
n = 100 , left side = 1.81138319373497e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98188616806265e-2
n = 200 , left side = 4.52886594521917e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06653894592026e-2
n = 500 , left side = 7.24636777071908e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47141131822251e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523831611e-7
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.16227608147314e-1
n = 20 , left side = 8.57307872321585e-10
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23606796892671e-1
n = 50 , left side = 1.66778292572710e-10
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356070531e-1
n = 100 , left side = 1.61355749321499e-10
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999998386443e-2
n = 200 , left side = 1.41525527114055e-10
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106779771292e-2
n = 500 , left side = 4.01468831931699e-11
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595098489e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 8.14417705162507e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.08083588965213e-1
n = 20 , left side = 2.04451572215358e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.21562282027825e-1
n = 50 , left side = 3.27307123230036e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41094049114079e-1
n = 100 , left side = 8.17942128127358e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99182057871873e-2
n = 200 , left side = 2.04561035900275e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06902220150647e-2
n = 500 , left side = 3.27470541416908e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47180848445816e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.88796875744184e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.47348078442420e-1
n = 20 , left side = 3.46106749496968e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88996122800282e-1
n = 50 , left side = 1.38657599904077e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27555596246902e-1
n = 100 , left side = 6.92779875289445e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30722012471056e-2
n = 200 , left side = 3.46437879098605e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72462993276687e-2
n = 500 , left side = 1.38664352198994e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33347160280059e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.36177783107461e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.09865988185763e-1
n = 20 , left side = 1.59327072888782e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22013527021091e-1
n = 50 , left side = 2.55270681782438e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41166085555527e-1
n = 100 , left side = 6.37527543482230e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99362472456518e-2
n = 200 , left side = 1.59359198846909e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06947421987701e-2
n = 500 , left side = 2.55130565363082e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47188082443422e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.44617147652922e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.81766051251546e-1
n = 20 , left side = 1.72865571687706e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.06320240581208e-1
n = 50 , left side = 6.92555552990447e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34495800707405e-1
n = 100 , left side = 3.46698227542804e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.65330177245720e-2
n = 200 , left side = 1.73278247468734e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.89778956439674e-2
n = 500 , left side = 6.92495905051582e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40288636449442e-2
```

```
-------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 5.75819452524406e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.10469571491594e-1
n = 20 , left side = 1.44242808346062e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22164369666518e-1
n = 50 , left side = 2.30930988249112e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41190425249060e-1
n = 100 , left side = 5.78328593896504e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99421671406104e-2
n = 200 , left side = 1.44542703056638e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06962238483491e-2
n = 500 , left side = 2.30995962646752e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47190495903693e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.17056957943215e-5
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.16196060321044e-1
n = 20 , left side = 8.21112944009224e-6
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23598586620539e-1
n = 50 , left side = 1.60967600009258e-6
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41419746561309e-1
n = 100 , left side = 1.55936473946361e-6
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99984406352605e-2
n = 200 , left side = 1.36805461285126e-6
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07093100640419e-2
n = 500 , left side = 3.88056297516311e-7
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47209714936983e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 9.84826134043602e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.01043618092528e-1
n = 20 , left side = 2.61046861206299e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.67181164909492e-2
n = 50 , left side = 4.22645955857948e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.04462410991563e-2
n = 100 , left side = 1.05840494480935e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.87523121105404e-2
n = 200 , left side = 2.64713303538500e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.42416576434360e-2
n = 500 , left side = 4.23591513531996e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28615410916111e-2
```

$$\cos(x)$$

```
n = 10 , left side = 2.54999238457694e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -5.54730069608056e-2
n = 20 , left side = 1.35881405538451e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -1.30586029268716e-2
n = 50 , left side = 5.52740754515297e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.39862520620602e-3
n = 100 , left side = 2.77036411956434e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.21070758597063e-2
n = 200 , left side = 1.38601618045097e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06462091424648e-2
n = 500 , left side = 5.54499938996761e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35890085299671e-3
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 7.25561006486467e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.26970130848241e-1
n = 20 , left side = 1.90326036120039e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.03790198999575e-1
n = 50 , left side = 3.07684651802387e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.15958541397119e-2
n = 100 , left side = 7.70350593050750e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.90403664622990e-2
n = 200 , left side = 1.92658947488322e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43137119994862e-2
n = 500 , left side = 3.08286271140101e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28730716158503e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.28642490007521e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.08837414893667e-2
n = 20 , left side = 6.81042176000301e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.47185850115489e-2
n = 50 , left side = 2.76476637677382e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.70250368899976e-2
n = 100 , left side = 1.38531517342038e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59575653211459e-2
n = 200 , left side = 6.93024738450046e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75761235624740e-2
n = 500 , left side = 2.77251035146458e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313898914997e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.40115086492427e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.35514722847645e-1
n = 20 , left side = 1.66715291654219e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.06151273446157e-1
n = 50 , left side = 2.69354395939936e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.19791566983364e-2
n = 100 , left side = 6.74326324543451e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.91363907308063e-2
n = 200 , left side = 1.68640444147772e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43377305028267e-2
n = 500 , left side = 2.69851091849738e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28769151337793e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.68331709595389e-4
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.99157899787293e-1
n = 20 , left side = 1.81936348617625e-7
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22822620675230e-1
n = 50 , left side = 0.000000000000000e0
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006577358e-2
n = 100 , left side = 4.77112203438756e-17
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553497e-2
n = 200 , left side = 3.99794287396218e-18
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 8.20395785813390e-17
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429642e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.73218987411665e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.72204332755721e-1
n = 20 , left side = 6.90589468087810e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.15916907930701e-1
n = 50 , left side = 1.10835163775858e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.35643490199772e-2
n = 100 , left side = 2.77209959256952e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95335070960928e-2
n = 200 , left side = 6.93101217303926e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44370608252441e-2
n = 500 , left side = 1.10899618147586e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28928102811496e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.35711685154782e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 6.38145463421061e-2
n = 20 , left side = 6.89464901817200e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.38763124298590e-2
n = 50 , left side = 2.77022557225578e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69704449351780e-2
n = 100 , left side = 1.38599886244430e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59507284309068e-2
n = 200 , left side = 6.93110233963076e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75752686073437e-2
n = 500 , left side = 2.77256501313650e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313352298278e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.02586050377558e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79267626459132e-1
n = 20 , left side = 5.11322907698697e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17709573534592e-1
n = 50 , left side = 8.20311672977692e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.38523889847581e-2
n = 100 , left side = 2.05156512414151e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96055605429356e-2
n = 200 , left side = 5.12940438202047e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44550769031543e-2
n = 500 , left side = 8.20726742556399e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28956929755388e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.80191579414196e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.31507073555468e-1
n = 20 , left side = 3.44939608010511e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.83288418105280e-2
n = 50 , left side = 1.38524597520625e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.08202409056733e-2
n = 100 , left side = 6.93016042367867e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.28805566316711e-2
n = 200 , left side = 3.46557187207862e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10407990748959e-2
n = 500 , left side = 1.38628390798491e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15176163349794e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.79004576579427e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.81625773838945e-1
n = 20 , left side = 4.51543399532361e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.18307368616255e-1
n = 50 , left side = 7.24292150887096e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.39484085068487e-2
n = 100 , left side = 1.81138319373497e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96295787359762e-2
n = 200 , left side = 4.52886594521917e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44610822875223e-2
n = 500 , left side = 7.24636777071908e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28966538751936e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.57869523831611e-7
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.99526073627364e-1
n = 20 , left side = 8.57307872321585e-10
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22822801754271e-1
n = 50 , left side = 1.66778292572710e-10
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727004909575e-2
n = 100 , left side = 1.61355749321499e-10
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107168939940e-2
n = 200 , left side = 1.41525527114055e-10
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063708054490e-2
n = 500 , left side = 4.01468831931699e-11
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002028174e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 8.14417705162507e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.91382054445263e-1
n = 20 , left side = 2.04451572215358e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.20778286889425e-1
n = 50 , left side = 3.27307123230036e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.43453935345057e-2
n = 100 , left side = 8.17942128127358e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97289228425370e-2
n = 200 , left side = 2.04561035900275e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44859148433845e-2
n = 500 , left side = 3.27470541416908e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29006255375502e-2
```

$$\cos(x)$$

```
n = 10 , left side = 6.88796875744184e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.30646543922470e-1
n = 20 , left side = 3.46106749496968e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.82121276618822e-2
n = 50 , left side = 1.38657599904077e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.08069406673280e-2
n = 100 , left side = 6.92779875289445e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.28829183024553e-2
n = 200 , left side = 3.46437879098605e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10419921559885e-2
n = 500 , left side = 1.38664352198994e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15172567209744e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.36177783107461e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.93164453665813e-1
n = 20 , left side = 1.59327072888782e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21229531882691e-1
n = 50 , left side = 2.55270681782438e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.44174299759533e-2
n = 100 , left side = 6.37527543482230e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97469643010015e-2
n = 200 , left side = 1.59359198846909e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44904350270898e-2
n = 500 , left side = 2.55130565363082e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29013489373107e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.44617147652922e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.65064516731596e-1
n = 20 , left side = 1.72865571687706e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.05536245442808e-1
n = 50 , left side = 6.92555552990447e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.77471451278313e-2
n = 100 , left side = 3.46698227542804e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.63437347799217e-2
n = 200 , left side = 1.73278247468734e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27735884722872e-2
n = 500 , left side = 6.92495905051582e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.22114043379127e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 1/2*pi, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 5.75819452524406e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.93768036971644e-1
n = 20 , left side = 1.44242808346062e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21380374528118e-1
n = 50 , left side = 2.30930988249112e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.44417696694866e-2
n = 100 , left side = 5.78328593896504e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97528841959601e-2
n = 200 , left side = 1.44542703056638e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44919166766688e-2
n = 500 , left side = 2.30995962646752e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29015902833379e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.17056957943215e-5
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.99494525801094e-1
n = 20 , left side = 8.21112944009224e-6
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22814591482139e-1
n = 50 , left side = 1.60967600009258e-6
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46710909817357e-2
n = 100 , left side = 1.55936473946361e-6
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98091576906103e-2
n = 200 , left side = 1.36805461285126e-6
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45050028923617e-2
n = 500 , left side = 3.88056297516311e-7
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29035121866668e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00168857534962e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.01018376092311e-1
n = 20 , left side = 1.13262072722325e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.93828458814580e-1
n = 50 , left side = 4.20732246994345e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.67176270011557e-1
n = 100 , left side = 2.03378378667144e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.30850805284244e-1
n = 200 , left side = 9.98779497231383e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94040782364523e-1
n = 500 , left side = 3.95085911348803e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51041039641346e-1
```

$$\cos(x)$$

```
n = 10 , left side = 9.93951714238188e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.01792062203454e-1
n = 20 , left side = 7.72328322774641e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.29857699259440e-1
n = 50 , left side = 3.60961128316283e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.73153381879363e-1
n = 100 , left side = 1.88410272392823e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.32347615911676e-1
n = 200 , left side = 9.61343382830904e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.94415143508528e-1
n = 500 , left side = 3.89095422715435e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.51100944527679e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$\sin(x)$

```
n = 10 , left side = 1.13322309591826e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.87864924035447e-1
n = 20 , left side = 6.09253390188926e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.46165192518012e-1
n = 50 , left side = 2.17255059254714e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.87523988785520e-1
n = 100 , left side = 1.03403776602992e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.40848265490659e-1
n = 200 , left side = 5.03665536910580e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98991921967731e-1
n = 500 , left side = 1.98226000171664e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53009638753117e-1
```

$\cos(x)$

```
n = 10 , left side = 3.12663766609833e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.69920856966289e-1
n = 20 , left side = 3.44627783783421e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72627753158562e-1
n = 50 , left side = 1.73741901387926e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.91875304572199e-1
n = 100 , left side = 9.25093740382432e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41937705747134e-1
n = 200 , left side = 4.76419447265553e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99264382864181e-1
n = 500 , left side = 1.93866173914425e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53053237015689e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.86823828109783e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.72504850816294e-1
n = 20 , left side = 1.14200334403044e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95670498096600e-1
n = 50 , left side = 1.90462132680691e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07344873384185e-1
n = 100 , left side = 4.76820716817317e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50711822434141e-1
n = 200 , left side = 1.19246801639772e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909330535197e-1
n = 500 , left side = 1.90813536952161e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972817401138e-1
```

$$\cos(x)$$

```
n = 10 , left side = 5.13589058368008e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.49828327790472e-1
n = 20 , left side = 1.19286950374289e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95161836499476e-1
n = 50 , left side = 1.90462392585333e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07344870785138e-1
n = 100 , left side = 4.76820716817428e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50711822434141e-1
n = 200 , left side = 1.19246801639328e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909330535198e-1
n = 500 , left side = 1.90813536953272e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972817401138e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.14144646548721e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.87042587078551e-1
n = 20 , left side = 5.36350821680255e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.53455449368879e-1
n = 50 , left side = 2.03721764988826e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.88877318212109e-1
n = 100 , left side = 9.99650895754645e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41192134193412e-1
n = 200 , left side = 4.95003907205882e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99078538264778e-1
n = 500 , left side = 1.96834136039681e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53023557394437e-1
```

$$\cos(x)$$

```
n = 10 , left side = 7.63132390190502e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.24873994608222e-1
n = 20 , left side = 4.38690929008562e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.63221438636048e-1
n = 50 , left side = 1.88047305777048e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.90444764133287e-1
n = 100 , left side = 9.60447484518001e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41584168305778e-1
n = 200 , left side = 4.85201975765370e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99176557579183e-1
n = 500 , left side = 1.95265778643006e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53039240968404e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.18104658618466e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.39376767765426e-1
n = 20 , left side = 2.80061711992697e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.79084360337635e-1
n = 50 , left side = 1.03752156519760e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.98874279059016e-1
n = 100 , left side = 5.04543144574476e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46143211705213e-1
n = 200 , left side = 2.48679978426469e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01541777552572e-1
n = 500 , left side = 9.86054094334721e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54005844660499e-1
```

$$\cos(x)$$

```
n = 10 , left side = 3.35723331340523e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.67614900493220e-1
n = 20 , left side = 2.07751849096550e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86315346627249e-1
n = 50 , left side = 9.21511983819845e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.00034374872793e-1
n = 100 , left side = 4.75529632502636e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46433346825932e-1
n = 200 , left side = 2.41425905034953e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01614318286487e-1
n = 500 , left side = 9.74447265982392e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54017451488851e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.23317176677876e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.88855515959485e-1
n = 20 , left side = 3.19271958223932e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03897811954665e-1
n = 50 , left side = 5.12151488168966e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08737343222823e-1
n = 100 , left side = 1.28083959738734e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060559191219e-1
n = 200 , left side = 3.20240359172885e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996553300920e-1
n = 500 , left side = 5.12398355012600e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986774771284e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.27760703918800e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.88411163235392e-1
n = 20 , left side = 3.19296312784956e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03897568409055e-1
n = 50 , left side = 5.12152374566921e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08737342336425e-1
n = 100 , left side = 1.28084284152230e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060558866806e-1
n = 200 , left side = 3.20237987473382e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996553538090e-1
n = 500 , left side = 5.12392899754133e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986774825836e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 5.44764920559380e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.46710741571334e-1
n = 20 , left side = 2.59004027714145e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.81190128765490e-1
n = 50 , left side = 1.00311377175122e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99218356993480e-1
n = 100 , left side = 4.96093970818390e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46227703442774e-1
n = 200 , left side = 2.46459813024336e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01563979206594e-1
n = 500 , left side = 9.82124425668585e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54009774329165e-1
```

$$\cos(x)$$

```
n = 10 , left side = 4.29522822629749e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.58234951364297e-1
n = 20 , left side = 2.30109143999059e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.84079617136999e-1
n = 50 , left side = 9.56870414660826e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99680790564383e-1
n = 100 , left side = 4.84524222640814e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.46343400924550e-1
n = 200 , left side = 2.43566015728058e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01592917179556e-1
n = 500 , left side = 9.77496918584397e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54014401836249e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.88447866653312e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.72342446961941e-1
n = 20 , left side = 1.33629574745268e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93727574062378e-1
n = 50 , left side = 5.08446410303787e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04165030607954e-1
n = 100 , left side = 2.49515406149969e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48693489089458e-1
n = 200 , left side = 1.23598531292535e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02792592023912e-1
n = 500 , left side = 4.92089942069840e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54499808812764e-1
```

$$\cos(x)$$

```
n = 10 , left side = 1.98502218336606e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.81337011793612e-1
n = 20 , left side = 1.11111768757201e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.95979354661184e-1
n = 50 , left side = 4.72342001665071e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04526074694341e-1
n = 100 , left side = 2.40486942054952e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48783773730408e-1
n = 200 , left side = 1.21344788187139e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02815129454966e-1
n = 500 , left side = 4.88483607931189e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54503415146903e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.06029054897750e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.97126943078295e-1
n = 20 , left side = 1.02946339325216e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.06061068143652e-1
n = 50 , left side = 1.59207524128235e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09090287186863e-1
n = 100 , left side = 3.92686042182122e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51149374546740e-1
n = 200 , left side = 1.13627155432505e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04017214621294e-1
n = 500 , left side = 1.89942238126850e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54989999332452e-1
```

$$\cos(x)$$

```
n = 10 , left side = 4.07812534676066e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.97109108280512e-1
n = 20 , left side = 1.01328357734054e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.06077247959564e-1
n = 50 , left side = 1.67763851029901e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09081730859962e-1
n = 100 , left side = 4.24032634578353e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51146239887500e-1
n = 200 , left side = 9.07022584961670e-6
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04019507110987e-1
n = 500 , left side = 1.37203563288502e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54990526719201e-1
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00168857534962e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.16058908481876e-1
n = 20 , left side = 1.13262072722325e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.10344725027654e-1
n = 50 , left side = 4.20732246994345e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.93481315378750e-2
n = 100 , left side = 2.03378378667144e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.96621621332856e-2
n = 200 , left side = 9.98779497231383e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.07228831463409e-2
n = 500 , left side = 3.95085911348803e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.07705004365078e-2
```

$$\cos(x)$$

```
n = 10 , left side = 9.93951714238188e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.16832594593019e-1
n = 20 , left side = 7.72328322774641e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.46373965472515e-1
n = 50 , left side = 3.60961128316283e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.05325243405681e-1
n = 100 , left side = 1.88410272392823e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.11589727607177e-2
n = 200 , left side = 9.61343382830904e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.10972442903457e-2
n = 500 , left side = 3.89095422715435e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.08304053228414e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.13322309591826e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.02905456425012e-1
n = 20 , left side = 6.09253390188926e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.62681458731086e-1
n = 50 , left side = 2.17255059254714e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.19695850311838e-1
n = 100 , left side = 1.03403776602992e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.96596223397008e-2
n = 200 , left side = 5.03665536910580e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.56740227495489e-2
n = 500 , left side = 1.98226000171664e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27390995482792e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.12663766609833e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.84961389355855e-1
n = 20 , left side = 3.44627783783421e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.89144019371637e-1
n = 50 , left side = 1.73741901387926e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.24047166098517e-1
n = 100 , left side = 9.25093740382432e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.07490625961757e-2
n = 200 , left side = 4.76419447265553e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.59464836459992e-2
n = 500 , left side = 1.93866173914425e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27826978108515e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.86823828109783e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.87545383205860e-1
n = 20 , left side = 1.14200334403044e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.12186764309675e-1
n = 50 , left side = 1.90462132680691e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39516734910503e-1
n = 100 , left side = 4.76820716817317e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95231792831827e-2
n = 200 , left side = 1.19246801639772e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05914313170150e-2
n = 500 , left side = 1.90813536952161e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47022781963006e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.13589058368008e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.64868860180037e-1
n = 20 , left side = 1.19286950374289e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.11678102712550e-1
n = 50 , left side = 1.90462392585333e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39516732311456e-1
n = 100 , left side = 4.76820716817428e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95231792831826e-2
n = 200 , left side = 1.19246801639328e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05914313170154e-2
n = 500 , left side = 1.90813536953272e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47022781963005e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.14144646548721e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.02083119468117e-1
n = 20 , left side = 5.36350821680255e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.69971715581953e-1
n = 50 , left side = 2.03721764988826e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.21049179738427e-1
n = 100 , left side = 9.99650895754645e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.00034910424536e-2
n = 200 , left side = 4.95003907205882e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.57606390465959e-2
n = 500 , left side = 1.96834136039681e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27530181895990e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.63132390190502e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.39914526997788e-1
n = 20 , left side = 4.38690929008562e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.79737704849123e-1
n = 50 , left side = 1.88047305777048e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.22616625659605e-1
n = 100 , left side = 9.60447484518001e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.03955251548200e-2
n = 200 , left side = 4.85201975765370e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.58586583610010e-2
n = 500 , left side = 1.95265778643006e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.27687017635657e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.18104658618466e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.54417300154991e-1
n = 20 , left side = 2.80061711992697e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.95600626550709e-1
n = 50 , left side = 1.03752156519760e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31046140585334e-1
n = 100 , left side = 5.04543144574476e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.49545685542552e-2
n = 200 , left side = 2.48679978426469e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82238783343901e-2
n = 500 , left side = 9.86054094334721e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37353054556611e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.35723331340523e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.82655432882786e-1
n = 20 , left side = 2.07751849096550e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.02831612840324e-1
n = 50 , left side = 9.21511983819845e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.32206236399111e-1
n = 100 , left side = 4.75529632502636e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.52447036749736e-2
n = 200 , left side = 2.41425905034953e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82964190683052e-2
n = 500 , left side = 9.74447265982392e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37469122840134e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.23317176677876e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.03896048349050e-1
n = 20 , left side = 3.19271958223932e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20414078167740e-1
n = 50 , left side = 5.12151488168966e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40909204749141e-1
n = 100 , left side = 1.28083959738734e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719160402613e-2
n = 200 , left side = 3.20240359172885e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06786540827375e-2
n = 500 , left side = 5.12398355012600e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162355664457e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.27760703918800e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.03451695624958e-1
n = 20 , left side = 3.19296312784956e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20413834622129e-1
n = 50 , left side = 5.12152374566921e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40909203862743e-1
n = 100 , left side = 1.28084284152230e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719157158478e-2
n = 200 , left side = 3.20237987473382e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06786543199074e-2
n = 500 , left side = 5.12392899754133e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162356209983e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 5.44764920559380e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.61751273960900e-1
n = 20 , left side = 2.59004027714145e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.97706394978564e-1
n = 50 , left side = 1.00311377175122e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31390218519797e-1
n = 100 , left side = 4.96093970818390e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.50390602918161e-2
n = 200 , left side = 2.46459813024336e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82460799884114e-2
n = 500 , left side = 9.82124425668585e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37392351243272e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.29522822629749e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.73275483753863e-1
n = 20 , left side = 2.30109143999059e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.00595883350073e-1
n = 50 , left side = 9.56870414660826e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31852652090701e-1
n = 100 , left side = 4.84524222640814e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.51547577735919e-2
n = 200 , left side = 2.43566015728058e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.82750179613742e-2
n = 500 , left side = 9.77496918584397e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.37438626314114e-2
```

```
-------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.88447866653312e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.87382979351507e-1
n = 20 , left side = 1.33629574745268e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.10243840275452e-1
n = 50 , left side = 5.08446410303787e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36336892134272e-1
n = 100 , left side = 2.49515406149969e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.75048459385003e-2
n = 200 , left side = 1.23598531292535e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.94746928057294e-2
n = 500 , left side = 4.92089942069840e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.42292696079260e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.98502218336606e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96377544183177e-1
n = 20 , left side = 1.11111768757201e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.12495620874259e-1
n = 50 , left side = 4.72342001665071e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36697936220659e-1
n = 100 , left side = 2.40486942054952e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.75951305794505e-2
n = 200 , left side = 1.21344788187139e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.94972302367834e-2
n = 500 , left side = 4.88483607931189e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.42328759420646e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.06029054897750e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.12167475467860e-1
n = 20 , left side = 1.02946339325216e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22577334356727e-1
n = 50 , left side = 1.59207524128235e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41262148713181e-1
n = 100 , left side = 3.92686042182122e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99607313957818e-2
n = 200 , left side = 1.13627155432505e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06993154031115e-2
n = 500 , left side = 1.89942238126850e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47194601276145e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.07812534676066e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.12149640670077e-1
n = 20 , left side = 1.01328357734054e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22593514172638e-1
n = 50 , left side = 1.67763851029901e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41253592386280e-1
n = 100 , left side = 4.24032634578353e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99575967365422e-2
n = 200 , left side = 9.07022584961670e-6
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07016078928051e-2
n = 500 , left side = 1.37203563288502e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47199875143629e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.00168857534962e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -6.42626038073607e-4
n = 20 , left side = 1.13262072722325e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.56072988925424e-3
n = 50 , left side = 4.20732246994345e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.25994759583012e-2
n = 100 , left side = 2.03378378667144e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.94728791886353e-2
n = 200 , left side = 9.98779497231383e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.45185759746607e-2
n = 500 , left side = 3.95085911348803e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.95304112947630e-3
```

$$\cos(x)$$

```
n = 10 , left side = 9.93951714238188e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.00131060073069e-1
n = 20 , left side = 7.72328322774641e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.55899703341149e-2
n = 50 , left side = 3.60961128316283e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.85765878261075e-2
n = 100 , left side = 1.88410272392823e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.09696898160675e-2
n = 200 , left side = 9.61343382830904e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.48929371186655e-2
n = 500 , left side = 3.89095422715435e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.01294601580997e-3
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.13322309591826e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.62039219050625e-2
n = 20 , left side = 6.09253390188926e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.18974635926864e-2
n = 50 , left side = 2.17255059254714e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.29471947322644e-2
n = 100 , left side = 1.03403776602992e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.94703393950506e-2
n = 200 , left side = 5.03665536910580e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.94697155778687e-2
n = 500 , left side = 1.98226000171664e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09216402412477e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.12663766609833e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.68259854835905e-1
n = 20 , left side = 3.44627783783421e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.83600242332369e-2
n = 50 , left side = 1.73741901387926e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.72985105189432e-2
n = 100 , left side = 9.25093740382432e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.05597796515254e-2
n = 200 , left side = 4.76419447265553e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.97421764743190e-2
n = 500 , left side = 1.93866173914425e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09652385038201e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.86823828109783e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.70843848685910e-1
n = 20 , left side = 1.14200334403044e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11402769171275e-1
n = 50 , left side = 1.90462132680691e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.27680793309288e-2
n = 100 , left side = 4.76820716817317e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93338963385324e-2
n = 200 , left side = 1.19246801639772e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43871241453347e-2
n = 500 , left side = 1.90813536952161e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848188892691e-2
```

$$\cos(x)$$

```
n = 10 , left side = 5.13589058368008e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.48167325660087e-1
n = 20 , left side = 1.19286950374289e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.10894107574150e-1
n = 50 , left side = 1.90462392585333e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.27680767318824e-2
n = 100 , left side = 4.76820716817428e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.93338963385323e-2
n = 200 , left side = 1.19246801639328e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43871241453352e-2
n = 500 , left side = 1.90813536953272e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28848188892690e-2
```

```
-------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.14144646548721e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.53815849481666e-2
n = 20 , left side = 5.36350821680255e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.91877204435536e-2
n = 50 , left side = 2.03721764988826e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.43005241588532e-2
n = 100 , left side = 9.99650895754645e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.98142080978033e-2
n = 200 , left side = 4.95003907205882e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.95563318749157e-2
n = 500 , left side = 1.96834136039681e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09355588825675e-2
```

$$\cos(x)$$

```
n = 10 , left side = 7.63132390190502e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.23212992477838e-1
n = 20 , left side = 4.38690929008562e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.89537097107229e-2
n = 50 , left side = 1.88047305777048e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.58679700800309e-2
n = 100 , left side = 9.60447484518001e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.02062422101697e-2
n = 200 , left side = 4.85201975765370e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.96543511893208e-2
n = 500 , left side = 1.95265778643006e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.09512424565343e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 6.18104658618466e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.37715765635041e-1
n = 20 , left side = 2.80061711992697e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.48166314123093e-2
n = 50 , left side = 1.03752156519760e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.42974850057598e-2
n = 100 , left side = 5.04543144574476e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.47652856096050e-2
n = 200 , left side = 2.48679978426469e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20195711627098e-2
n = 500 , left side = 9.86054094334721e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19178461486296e-2
```

$$\cos(x)$$

```
n = 10 , left side = 3.35723331340523e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.65953898362836e-1
n = 20 , left side = 2.07751849096550e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02047617701924e-1
n = 50 , left side = 9.21511983819845e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.54575808195373e-2
n = 100 , left side = 4.75529632502636e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.50554207303234e-2
n = 200 , left side = 2.41425905034953e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20921118966250e-2
n = 500 , left side = 9.74447265982392e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19294529769819e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 1.23317176677876e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.87194513829100e-1
n = 20 , left side = 3.19271958223932e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19630083029340e-1
n = 50 , left side = 5.12151488168966e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41605491695668e-2
n = 100 , left side = 1.28083959738734e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826330956110e-2
n = 200 , left side = 3.20240359172885e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44743469110572e-2
n = 500 , left side = 5.12398355012600e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987762594142e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.27760703918800e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.86750161105008e-1
n = 20 , left side = 3.19296312784956e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19629839483729e-1
n = 50 , left side = 5.12152374566921e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41605482831688e-2
n = 100 , left side = 1.28084284152230e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826327711975e-2
n = 200 , left side = 3.20237987473382e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44743471482272e-2
n = 500 , left side = 5.12392899754133e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987763139668e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 5.44764920559380e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.45049739440950e-1
n = 20 , left side = 2.59004027714145e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.69223998401646e-2
n = 50 , left side = 1.00311377175122e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.46415629402236e-2
n = 100 , left side = 4.96093970818390e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.48497773471658e-2
n = 200 , left side = 2.46459813024336e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20417728167311e-2
n = 500 , left side = 9.82124425668585e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19217758172957e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.29522822629749e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.56573949233913e-1
n = 20 , left side = 2.30109143999059e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.98118882116732e-2
n = 50 , left side = 9.56870414660826e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.51039965111275e-2
n = 100 , left side = 4.84524222640814e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.49654748289416e-2
n = 200 , left side = 2.43566015728058e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.20707107896939e-2
n = 500 , left side = 9.77496918584397e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.19264033243799e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 2.88447866653312e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.70681444831557e-1
n = 20 , left side = 1.33629574745268e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.09459845137052e-1
n = 50 , left side = 5.08446410303787e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.95882365546979e-2
n = 100 , left side = 2.49515406149969e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.73155629938500e-2
n = 200 , left side = 1.23598531292535e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.32703856340492e-2
n = 500 , left side = 4.92089942069840e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.24118103008945e-2
```

$$\cos(x)$$

```
n = 10 , left side = 1.98502218336606e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79676009663227e-1
n = 20 , left side = 1.11111768757201e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.11711625735859e-1
n = 50 , left side = 4.72342001665071e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.99492806410850e-2
n = 100 , left side = 2.40486942054952e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.74058476348002e-2
n = 200 , left side = 1.21344788187139e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.32929230651031e-2
n = 500 , left side = 4.88483607931189e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.24154166350331e-2
```

```
--------------------------------------------------------------------------------
```

```
x0 = 3/4*pi, Power = 7/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 10 , left side = 4.06029054897750e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.95465940947911e-1
n = 20 , left side = 1.02946339325216e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21793339218327e-1
n = 50 , left side = 1.59207524128235e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.45134931336075e-2
n = 100 , left side = 3.92686042182122e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97714484511315e-2
n = 200 , left side = 1.13627155432505e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44950082314313e-2
n = 500 , left side = 1.89942238126850e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29020008205831e-2
```

$$\cos(x)$$

```
n = 10 , left side = 4.07812534676066e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.95448106150127e-1
n = 20 , left side = 1.01328357734054e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21809519034239e-1
n = 50 , left side = 1.67763851029901e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.45049368067059e-2
n = 100 , left side = 4.24032634578353e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97683137918919e-2
n = 200 , left side = 9.07022584961670e-6
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44973007211249e-2
n = 500 , left side = 1.37203563288502e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29025282073314e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [x^(1/3), x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for power in powers:
    ##########################################################
    for lamda in lamdas:  #going over each lamda value
    ##########################################################
        for q in qs:      #going over each q value
        ############################################################
            print()
            print()
           ␣
↪print("-------------------------------------------------------------------------------")
            print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
           ␣
↪print("-------------------------------------------------------------------------------")


            #the activation function
            phi(x) =  (e^(lamda*x)-q*e^(-lamda*x))/(e^(lamda*x)+q*e^(-lamda*x)) ␣
↪ #formula  18.1

            #
            G(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 18.9

            ##########################################################
            for i in range(len(funcs)):
            ##########################################################
                f(x)=funcs[i]
                show(f(x))
                for n in [10, 20, 50, 100, 200, 500]:
                    #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                    #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                    #leftSide = abs(L(n,f,x0)-f(x0))
```

```
                    leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                    val1 = n
                    val2 = leftSide.n()
                    val3 = 1/(n^power).n()
                    print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10 , left side = 4.65939350634126e-2
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 4.54593298563860e-1
          n = 20 , left side = 5.39175273339064e-2
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 3.53173004202998e-1
          n = 50 , left side = 2.66706958509516e-2
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.82578798860040e-1
          n = 100 , left side = 1.39692422376505e-2
                    1/n^(3/10) = 2.51188643150958e-1
                    difference = 2.37219400913308e-1
          n = 200 , left side = 7.15466879542836e-3
                    1/n^(3/10) = 2.04028577336837e-1
                    difference = 1.96873908541409e-1
          n = 500 , left side = 2.90466167844949e-3
                    1/n^(3/10) = 1.54991898754834e-1
                    difference = 1.52087237076384e-1
```

$$x$$

```
          n = 10 , left side = 1.46960541508878e-1
                    1/n^(3/10) = 5.01187233627272e-1
                    difference = 3.54226692118394e-1
          n = 20 , left side = 1.28044818944893e-1
                    1/n^(3/10) = 4.07090531536904e-1
                    difference = 2.79045712592011e-1
          n = 50 , left side = 5.54458428059442e-2
                    1/n^(3/10) = 3.09249494710992e-1
                    difference = 2.53803651905048e-1
          n = 100 , left side = 2.77258872001896e-2
```

```
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.23462755950768e-1
n = 200 , left side = 1.38629436111991e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.90165633725638e-1
n = 500 , left side = 5.54517744447935e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49446721310354e-1
```

x^2

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.57118276412179e-1
n = 20 , left side = 1.73393496362237e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.33697035174667e-1
n = 50 , left side = 6.39143140576404e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.45335180653351e-1
n = 100 , left side = 2.98438925970291e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.21344750553929e-1
n = 200 , left side = 1.43924449634693e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.89636132373368e-1
n = 500 , left side = 5.62989766084276e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.49362001093991e-1
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.30655152140317e-1
n = 20 , left side = 1.75303858260733e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.31786673276171e-1
n = 50 , left side = 5.53534166881951e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.53896078022797e-1
n = 100 , left side = 2.41049670707777e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.27083676080180e-1
n = 200 , left side = 1.12081526845386e-2
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.92820424652298e-1
n = 500 , left side = 4.28703175655951e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.50704866998274e-1
```

x^4

```
n = 10 , left side = 2.71811655321145e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 2.29375578306128e-1
n = 20 , left side = 1.59700780897926e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 2.47389750638979e-1
n = 50 , left side = 4.27867893894554e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.66462705321536e-1
n = 100 , left side = 1.73213915349858e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.33867251615972e-1
n = 200 , left side = 7.76000677274204e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96268570564095e-1
n = 500 , left side = 2.90182870840223e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52090070046431e-1
```

x^{10}

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.14336410295721e-1
n = 20 , left side = 6.58347789205075e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.41255752616397e-1
n = 50 , left side = 4.87085072187464e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04378643989117e-1
n = 100 , left side = 1.09970741430996e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50088935736648e-1
n = 200 , left side = 3.82804893814586e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03645772443022e-1
n = 500 , left side = 1.24276968148264e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54867621786685e-1
```

```
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96080052578450e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.81579228369427e-1
n = 20 , left side = 2.08299179386359e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86260613598269e-1
n = 50 , left side = 1.26071386109592e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96642356100033e-1
n = 100 , left side = 6.81015763376169e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44378485517196e-1
n = 200 , left side = 3.53432821873112e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00494249118106e-1
n = 500 , left side = 1.44549650366488e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53546402251169e-1
```

$$x$$

```
n = 10 , left side = 5.68097172543791e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.44377516372893e-1
n = 20 , left side = 6.32752819000137e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.43815249636891e-1
n = 50 , left side = 2.77227554082915e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81526739302700e-1
n = 100 , left side = 1.38629435997853e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37325699551173e-1
n = 200 , left side = 6.93147180559972e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097105531237e-1
n = 500 , left side = 2.77258872223995e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219310032594e-1
```

$$x^2$$

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.53314481216394e-1
n = 20 , left side = 9.78605569036922e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.09229974633212e-1
n = 50 , left side = 3.38868135786705e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.75362681132321e-1
n = 100 , left side = 1.54044053860309e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.35784237764927e-1
n = 200 , left side = 7.31683725369431e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96711740083143e-1
n = 500 , left side = 2.83424719393494e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52157651560899e-1
```

x^3

```
n = 10 , left side = 1.73192000431426e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.27995233195847e-1
n = 20 , left side = 1.03864925521532e-1
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.03225606015372e-1
n = 50 , left side = 3.05073733511566e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.78742121359835e-1
n = 100 , left side = 1.27681795752464e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.38420463575712e-1
n = 200 , left side = 5.78399942625288e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98244577910584e-1
n = 500 , left side = 2.17239948281706e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52819499272017e-1
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.20929878931060e-1
n = 20 , left side = 9.63498090064417e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.10740722530463e-1
```

```
n = 50 , left side = 2.41914336230855e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.85058061087906e-1
n = 100 , left side = 9.37035404303910e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.41818289107919e-1
n = 200 , left side = 4.05904957310241e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.99969527763735e-1
n = 500 , left side = 1.47973714572865e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53512161609105e-1
```

$$x^{10}$$

```
n = 10 , left side = 1.19260700953333e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.81926532673939e-1
n = 20 , left side = 3.73465208237525e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.69744010713152e-1
n = 50 , left side = 2.80162956157206e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.06447865149420e-1
n = 100 , left side = 6.32905221145845e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50555737929812e-1
n = 200 , left side = 2.12043953336508e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03816533383500e-1
n = 500 , left side = 6.54808182457762e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54926417936588e-1


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 8.10134985303516e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.20173735096921e-1
n = 20 , left side = 1.68560763315217e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90234455205383e-1
n = 50 , left side = 1.97802106438832e-3
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07271473646603e-1
n = 100 , left side = 4.80026592954430e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50708616558004e-1
n = 200 , left side = 1.19239646471425e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03909337690366e-1
n = 500 , left side = 1.90449720897101e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54972853782744e-1
```

x

```
n = 10 , left side = 4.91637605442458e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.52023473083027e-1
n = 20 , left side = 3.39394250680042e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03696589030104e-1
n = 50 , left side = 1.64890433890230e-6
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09247845806653e-1
n = 100 , left side = 5.86114490275236e-12
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643145097e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 5.25230782287648e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.48664155398508e-1
n = 20 , left side = 2.83373415030339e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.78753190033871e-1
n = 50 , left side = 5.39457664221732e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03854918068774e-1
n = 100 , left side = 1.34928057788158e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49839362573076e-1
n = 200 , left side = 3.37320146703013e-4
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03691257190134e-1
n = 500 , left side = 5.39712234724488e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54937927531361e-1
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.18963782998903e-1
n = 20 , left side = 4.36057626242193e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.63484768912685e-1
n = 50 , left side = 8.09259320656272e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01156901504429e-1
n = 100 , left side = 2.02392086959333e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49164722281365e-1
n = 200 , left side = 5.05980220054492e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03522597116782e-1
n = 500 , left side = 8.09568352087009e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54910941919625e-1
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.00134260333710e-1
n = 20 , left side = 4.67481413489399e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.60342390187965e-1
n = 50 , left side = 8.21282675171919e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01036667959273e-1
n = 100 , left side = 2.03145927015694e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49157183880801e-1
n = 200 , left side = 5.06451370153385e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03522125966684e-1
n = 500 , left side = 8.09688966512678e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54910929858182e-1
```

$$x^{10}$$

```
n = 10 , left side = 7.01207124827065e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.31066521144566e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86933061112271e-1
n = 50 , left side = 1.42480124701184e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07824693463980e-1
n = 100 , left side = 2.63178146244861e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50925465004713e-1
n = 200 , left side = 6.08599933529959e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03967717343484e-1
n = 500 , left side = 9.52678518000342e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54982371969654e-1
```

---

x0 = 1/2, Power = 3/10, lamda = 1/2, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.33369660315088e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.47850267595764e-1
n = 20 , left side = 3.23728371506258e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.74717694386279e-1
n = 50 , left side = 1.39366391997124e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95312855511279e-1
n = 100 , left side = 7.14621856758857e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44042424583369e-1
n = 200 , left side = 3.61961230894126e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00408965027896e-1
n = 500 , left side = 1.45930076253686e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53532597992297e-1
```

x

```
n = 10 , left side = 1.29071817455777e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.72115416171495e-1
n = 20 , left side = 6.92514035886481e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.37839127948256e-1
n = 50 , left side = 2.77258876437841e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.81523607067208e-1
n = 100 , left side = 1.38629438314646e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.37325699319493e-1
n = 200 , left side = 6.93147191573251e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.97097105421104e-1
n = 500 , left side = 2.77258876629327e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52219309988540e-1
```

x^2

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.23796320108465e-1
n = 20 , left side = 8.30737213816240e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.24016810155280e-1
n = 50 , left side = 2.99438930027937e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.79305601708198e-1
n = 100 , left side = 1.44174451738843e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.36771197977074e-1
n = 200 , left side = 7.07009725133750e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.96958480085499e-1
n = 500 , left side = 2.79476881998975e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52197129934844e-1
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.19480393609674e-1
n = 20 , left side = 7.48642399521749e-2
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.32226291584729e-1
n = 50 , left side = 2.42632851043290e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.84986209606663e-1
n = 100 , left side = 1.12466925545658e-2
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.39941950596392e-1
n = 200 , left side = 5.40875852362388e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 1.98619818813213e-1
n = 500 , left side = 2.11285351660367e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.52879045238230e-1
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.33400055557578e-1
n = 20 , left side = 6.03397370785075e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.46750794458397e-1
n = 50 , left side = 1.74893080184918e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.91760186692500e-1
n = 100 , left side = 7.79966635748697e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43388976793471e-1
n = 200 , left side = 3.67816819644864e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00350409140388e-1
n = 500 , left side = 1.41984974971847e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53572049005115e-1
```

x^{10}

```
n = 10 , left side = 7.68027797084298e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.24384453918843e-1
n = 20 , left side = 9.76146773173466e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.97329063805170e-1
n = 50 , left side = 1.13068528957820e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08118809421414e-1
n = 100 , left side = 3.88474877995726e-4
```

```
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.50800168272962e-1
        n = 200 , left side = 1.62038602246220e-4
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03866538734591e-1
        n = 500 , left side = 5.81892063837631e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54933709548450e-1


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.96445247579275e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.81542708869345e-1
        n = 20 , left side = 1.48888789279412e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.92201652608963e-1
        n = 50 , left side = 6.77605354912070e-3
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.02473441161871e-1
        n = 100 , left side = 3.52568356510685e-3
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.47662959585851e-1
        n = 200 , left side = 1.79801315131500e-3
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.02230564185522e-1
        n = 500 , left side = 7.27768804897111e-4
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54264129949937e-1
```

$$x$$

```
        n = 10 , left side = 6.38935662496244e-2
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.37293667377648e-1
        n = 20 , left side = 3.46235470985199e-2
                1/n^(3/10) = 4.07090531536904e-1
                difference = 3.72466984438385e-1
        n = 50 , left side = 1.38629429714340e-2
                1/n^(3/10) = 3.09249494710992e-1
                difference = 2.95386551739558e-1
        n = 100 , left side = 6.93147149063511e-3
                1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.44257171660323e-1
n = 200 , left side = 3.46573574531772e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00562841591519e-1
n = 500 , left side = 1.38629429812720e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53605604456707e-1
```

x^2

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.99956038458590e-1
n = 20 , left side = 4.48623512045705e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.62228180332334e-1
n = 50 , left side = 1.55044047114581e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.93745089999534e-1
n = 100 , left side = 7.34183692697737e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.43846806223981e-1
n = 200 , left side = 3.56832710440319e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00460250232434e-1
n = 500 , left side = 1.40270891558075e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53589189839253e-1
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.92136053485583e-1
n = 20 , left side = 4.22970110547811e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.64793520482123e-1
n = 50 , left side = 1.29223379237350e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.96327156787257e-1
n = 100 , left side = 5.82201903348833e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.45366624117470e-1
n = 200 , left side = 2.75417225524147e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01274405081595e-1
n = 500 , left side = 1.06440558786389e-3
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53927493166970e-1
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(3/10) = 5.01187233627272e-1
          difference = 3.98646348945873e-1
n = 20 , left side = 3.49981874860216e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72092344050883e-1
n = 50 , left side = 9.52960631552958e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.99719888395462e-1
n = 100 , left side = 4.09764755001929e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47090995600939e-1
n = 200 , left side = 1.88876104704880e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02139816289788e-1
n = 500 , left side = 7.17895958025183e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54274002796809e-1
```

x^{10}

```
n = 10 , left side = 4.39432749437958e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.57243958683477e-1
n = 20 , left side = 5.59881198565948e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.01491719551245e-1
n = 50 , left side = 6.58122885628435e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08591371825363e-1
n = 100 , left side = 2.17135216419696e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50971507934538e-1
n = 200 , left side = 8.67799400496487e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03941797396787e-1
n = 500 , left side = 3.00238003038830e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54961874954530e-1
```

```
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245119e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.82328897802761e-1
n = 20 , left side = 3.43036193768762e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.03660169599217e-1
n = 50 , left side = 5.15745217625541e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08733749493366e-1
n = 100 , left side = 1.28085535782807e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51060557615175e-1
n = 200 , left side = 3.19697272262998e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03996607609611e-1
n = 500 , left side = 5.11285838666886e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54986785896447e-1
```

$$x$$

```
n = 10 , left side = 3.03097878388953e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.98156254843383e-1
n = 20 , left side = 1.79813965206499e-5
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.07072550140384e-1
n = 50 , left side = 5.04973840520506e-12
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09249494705942e-1
n = 100 , left side = 1.11022302462516e-16
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51188643150958e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 5.55111512312578e-17
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

$$x^2$$

```
n = 10 , left side = 3.13288100022530e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.69858423625019e-1
n = 20 , left side = 9.02981956494553e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.98060711971959e-1
n = 50 , left side = 1.44928066358080e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07800214047411e-1
n = 100 , left side = 3.62320167826280e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50826322983132e-1
n = 200 , left side = 9.05800419565561e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03937997294880e-1
n = 500 , left side = 1.44928067130623e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54977405948121e-1
```

x^3

```
n = 10 , left side = 4.78600213916086e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.53327212235664e-1
n = 20 , left side = 1.35520533206201e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93538478216284e-1
n = 50 , left side = 2.17392099772531e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07075573713266e-1
n = 100 , left side = 5.43480251739309e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50645162899219e-1
n = 200 , left side = 1.35870062934806e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03892707273902e-1
n = 500 , left side = 2.17392100695102e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54970159544764e-1
```

x^4

```
n = 10 , left side = 5.14533906505907e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.49733842976682e-1
n = 20 , left side = 1.38732244570932e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93217307079811e-1
```

```
n = 50 , left side = 2.18227896612364e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.07067215744868e-1
n = 100 , left side = 5.44002624822695e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.50644640526135e-1
n = 200 , left side = 1.35902711252578e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03892674625584e-1
n = 500 , left side = 2.17400458664835e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54970158708967e-1
```

$$x^{10}$$

```
n = 10 , left side = 2.39574413183785e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.77229792308894e-1
n = 20 , left side = 2.97086004062642e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.04119671496278e-1
n = 50 , left side = 2.83599622557975e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08965895088434e-1
n = 100 , left side = 6.54249762594573e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51123218174699e-1
n = 200 , left side = 1.60297404174447e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04012547596420e-1
n = 500 , left side = 2.55030753047421e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54989348447303e-1
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 3.15884348850566e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.69598798742216e-1
n = 20 , left side = 1.69988381319672e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.90091693404937e-1
n = 50 , left side = 7.10929624048973e-3
```

```
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.02140198470502e-1
n = 100 , left side = 3.60940309324842e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47579240057710e-1
n = 200 , left side = 1.81874048780928e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02209836849028e-1
n = 500 , left side = 7.30913664388266e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54260985090445e-1
```

x

```
n = 10 , left side = 6.92279510900182e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.31959282537254e-1
n = 20 , left side = 3.46421335720477e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.72448397964857e-1
n = 50 , left side = 1.38568544082612e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.95392640302730e-1
n = 100 , left side = 6.92842720413067e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44260215946827e-1
n = 200 , left side = 3.46421360206539e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00564363734772e-1
n = 500 , left side = 1.38568544082618e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53606213314008e-1
```

x^2

```
n = 10 , left side = 8.55451218222509e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.15642111805021e-1
n = 20 , left side = 3.87308178004870e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.68359713736417e-1
n = 50 , left side = 1.45110441151024e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.94738450595889e-1
n = 100 , left side = 7.09197463084094e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.44096668520117e-1
n = 200 , left side = 3.50510045874292e-3
```

```
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.00523476878094e-1
n = 500 , left side = 1.39222733789462e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53599671416939e-1
```

x^3

```
n = 10 , left side = 7.91097899306038e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.22077443696669e-1
n = 20 , left side = 3.24567771921774e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.74633754344727e-1
n = 50 , left side = 1.13958230614945e-2
          1/n^(3/10) = 3.09249494710992e-1
          difference = 2.97853671649497e-1
n = 100 , left side = 5.44437875504283e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.45744264395915e-1
n = 200 , left side = 2.65983263805031e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.01368744698787e-1
n = 500 , left side = 1.04909882391729e-3
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.53942799930916e-1
```

x^4

```
n = 10 , left side = 6.53260321168637e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.35861201510409e-1
n = 20 , left side = 2.41899798353885e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.82900551701516e-1
n = 50 , left side = 7.95482775153313e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01294666959459e-1
n = 100 , left side = 3.71509170320668e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47473551447751e-1
n = 200 , left side = 1.79412654760111e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02234450789236e-1
n = 500 , left side = 7.02699493465395e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54289199261368e-1
```

$$x^{10}$$

```
n = 10 , left side = 1.23005431860469e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.88886690441225e-1
n = 20 , left side = 1.95443229260425e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.05136099244300e-1
n = 50 , left side = 4.11078488591595e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08838416222400e-1
n = 100 , left side = 1.66923378278077e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51021719772680e-1
n = 200 , left side = 7.51857729315232e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03953391563905e-1
n = 500 , left side = 2.82350791906388e-5
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54963663675643e-1
```

---

x0 = 1/2, Power = 3/10, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.40292664147630e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.87157967212509e-1
n = 20 , left side = 8.09536658966781e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.98995164947237e-1
n = 50 , left side = 3.49396872417307e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.05755525986819e-1
n = 100 , left side = 1.79071372384143e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49397929427117e-1
n = 200 , left side = 9.06435452010634e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03122141884826e-1
n = 500 , left side = 3.65254093297129e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54626644661537e-1
```

x

```
n = 10 , left side = 3.46541098802871e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.66533123746985e-1
n = 20 , left side = 1.73420259977516e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.89748505539153e-1
n = 50 , left side = 6.93681090501508e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.02312683805977e-1
n = 100 , left side = 3.46840545250782e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47720237698450e-1
n = 200 , left side = 1.73420272625380e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02294374610583e-1
n = 500 , left side = 6.93681090501386e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54298217664332e-1
```

x^2

```
n = 10 , left side = 4.73903023658121e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.53796931261460e-1
n = 20 , left side = 2.05308163937205e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.86559715143184e-1
n = 50 , left side = 7.44701748385268e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.01802477227139e-1
n = 100 , left side = 3.59595709721700e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.47592686053741e-1
n = 200 , left side = 1.76609063743116e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02262486699406e-1
n = 500 , left side = 6.98783156289906e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54293115598544e-1
```

x^3

```
n = 10 , left side = 4.63238425467439e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.54863391080528e-1
n = 20 , left side = 1.79448446203553e-2
```

```
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.89145686916549e-1
n = 50 , left side = 5.97784700290624e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.03271647708085e-1
n = 100 , left side = 2.79387267593101e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.48394770475027e-1
n = 200 , left side = 1.34863905139215e-3
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.02679938285445e-1
n = 500 , left side = 5.27923845514616e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54463974909319e-1
```

x^4

```
n = 10 , left side = 3.94349040023764e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.61752329624896e-1
n = 20 , left side = 1.37990548305422e-2
          1/n^(3/10) = 4.07090531536904e-1
          difference = 3.93291476706362e-1
n = 50 , left side = 4.25445841424152e-3
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.04995036296750e-1
n = 100 , left side = 1.92806775614625e-3
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.49260575394812e-1
n = 200 , left side = 9.15246967505515e-4
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03113330369331e-1
n = 500 , left side = 3.54513590363287e-4
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54637385164470e-1
```

x^{10}

```
n = 10 , left side = 7.27638680160743e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.93910846825665e-1
n = 20 , left side = 1.19062238971356e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.05899909147191e-1
n = 50 , left side = 2.37641399649618e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09011853311342e-1
n = 100 , left side = 9.15159839724954e-5
```

```
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51097127166986e-1
        n = 200 , left side = 3.96334550487991e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.03988943881788e-1
        n = 500 , left side = 1.44549073568421e-5
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54977443847477e-1


--------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 4.43886557706544e-3
                1/n^(3/10) = 5.01187233627272e-1
                difference = 4.96748368050207e-1
        n = 20 , left side = 1.03630053646838e-3
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.06054231000436e-1
        n = 50 , left side = 1.63624778015015e-4
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.09085869932977e-1
        n = 100 , left side = 4.08320646757554e-5
                1/n^(3/10) = 2.51188643150958e-1
                difference = 2.51147811086282e-1
        n = 200 , left side = 1.02034164284337e-5
                1/n^(3/10) = 2.04028577336837e-1
                difference = 2.04018373920409e-1
        n = 500 , left side = 1.63234093675246e-6
                1/n^(3/10) = 1.54991898754834e-1
                difference = 1.54990266413897e-1
```

$$x$$

```
        n = 10 , left side = 1.58663982219309e-5
                1/n^(3/10) = 5.01187233627272e-1
                difference = 5.01171367229050e-1
        n = 20 , left side = 6.52684128965575e-10
                1/n^(3/10) = 4.07090531536904e-1
                difference = 4.07090530884220e-1
        n = 50 , left side = 0.000000000000000e0
                1/n^(3/10) = 3.09249494710992e-1
                difference = 3.09249494710992e-1
        n = 100 , left side = 0.000000000000000e0
                1/n^(3/10) = 2.51188643150958e-1
```

```
          difference = 2.51188643150958e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04028577336837e-1
n = 500 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991898754834e-1
```

x^2

```
n = 10 , left side = 1.15428308402608e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.89644402787012e-1
n = 20 , left side = 2.89205247195795e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.04198479064946e-1
n = 50 , left side = 4.62728557739434e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08786766153252e-1
n = 100 , left side = 1.15682139434858e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51072961011523e-1
n = 200 , left side = 2.89205348588673e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03999656801978e-1
n = 500 , left side = 4.62728557748537e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54987271469256e-1
```

x^3

```
n = 10 , left side = 1.73200399632407e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.83867193664032e-1
n = 20 , left side = 4.33807899343377e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.02752452543471e-1
n = 50 , left side = 6.94092836609345e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08555401874382e-1
n = 100 , left side = 1.73523209152371e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51015119941806e-1
n = 200 , left side = 4.33808022881066e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03985196534549e-1
n = 500 , left side = 6.94092836614479e-6
```

```
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54984957826468e-1
```

x^4

```
n = 10 , left side = 1.77823913197880e-2
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.83404842307484e-1
n = 20 , left side = 4.36734781351719e-3
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.02723183723387e-1
n = 50 , left side = 6.94842122375819e-4
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.08554652588616e-1
n = 100 , left side = 1.73570039512738e-4
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51015073111445e-1
n = 200 , left side = 4.33837291856087e-5
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.03985193607651e-1
n = 500 , left side = 6.94100329461100e-6
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54984957751539e-1
```

x^{10}

```
n = 10 , left side = 4.06239089134456e-3
          1/n^(3/10) = 5.01187233627272e-1
          difference = 4.97124842735928e-1
n = 20 , left side = 6.12650024829540e-4
          1/n^(3/10) = 4.07090531536904e-1
          difference = 4.06477881512075e-1
n = 50 , left side = 8.38305099970637e-5
          1/n^(3/10) = 3.09249494710992e-1
          difference = 3.09165664200995e-1
n = 100 , left side = 2.04889255338266e-5
          1/n^(3/10) = 2.51188643150958e-1
          difference = 2.51168154225424e-1
n = 200 , left side = 5.09329964822080e-6
          1/n^(3/10) = 2.04028577336837e-1
          difference = 2.04023484037189e-1
n = 500 , left side = 8.13635935028711e-7
          1/n^(3/10) = 1.54991898754834e-1
          difference = 1.54991085118899e-1
```

```
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.65939350634126e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.69633830953425e-1
n = 20 , left side = 5.39175273339064e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.69689270416073e-1
n = 50 , left side = 2.66706958509516e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.14750660386358e-1
n = 100 , left side = 1.39692422376505e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.60307577623495e-2
n = 200 , left side = 7.15466879542836e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.35560093232264e-2
n = 500 , left side = 2.90466167844949e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18166978715463e-2
```

$$x$$

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.69267224507960e-1
n = 20 , left side = 1.28044818944893e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 9.55619788050856e-2
n = 50 , left side = 5.54458428059442e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.59755134313653e-2
n = 100 , left side = 2.77258872001896e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.22741127998104e-2
n = 200 , left side = 1.38629436111991e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.68477345074556e-2
n = 500 , left side = 5.54517744447935e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.91761821055164e-2
```

$$x^2$$

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 7.21588088017442e-2
n = 20 , left side = 1.73393496362237e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 5.02133013877419e-2
n = 50 , left side = 6.39143140576404e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 7.75070421796691e-2
n = 100 , left side = 2.98438925970291e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.01561074029709e-2
n = 200 , left side = 1.43924449634693e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.63182331551854e-2
n = 500 , left side = 5.62989766084276e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 3.90914618891530e-2
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.56956845298823e-2
n = 20 , left side = 1.75303858260733e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 4.83029394892459e-2
n = 50 , left side = 5.53534166881951e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 8.60679395491144e-2
n = 100 , left side = 2.41049670707777e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 7.58950329292223e-2
n = 200 , left side = 1.12081526845386e-2
          1/n^(1/2) = 7.07106781186548e-2
          difference = 5.95025254341161e-2
n = 500 , left side = 4.28703175655951e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.04343277934363e-2
```

x^4

```
n = 10 , left side = 2.71811655321145e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 4.44161106956934e-2
n = 20 , left side = 1.59700780897926e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 6.39060168520534e-2
```

```
n = 50 , left side = 4.27867893894554e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 9.86345668478541e-2
n = 100 , left side = 1.73213915349858e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.26786084650142e-2
n = 200 , left side = 7.76000677274204e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.29506713459127e-2
n = 500 , left side = 2.90182870840223e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18195308415936e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.29376942685286e-1
n = 20 , left side = 6.58347789205075e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.57772018829471e-1
n = 50 , left side = 4.87085072187464e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36550505515435e-1
n = 100 , left side = 1.09970741430996e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.89002925856901e-2
n = 200 , left side = 3.82804893814586e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03278732248402e-2
n = 500 , left side = 1.24276968148264e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.45970825818475e-2


-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96080052578450e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96619760758993e-1
n = 20 , left side = 2.08299179386359e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.02776879811343e-1
n = 50 , left side = 1.26071386109592e-2
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28814217626350e-1
n = 100 , left side = 6.81015763376169e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.31898423662383e-2
n = 200 , left side = 3.53432821873112e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.71763498999236e-2
n = 500 , left side = 1.44549650366488e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32758630463309e-2
```

x

```
n = 10 , left side = 5.68097172543791e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.59418048762459e-1
n = 20 , left side = 6.32752819000137e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.60331515849965e-1
n = 50 , left side = 2.77227554082915e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.13698600829018e-1
n = 100 , left side = 1.38629435997853e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.61370564002147e-2
n = 200 , left side = 6.93147180559972e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37792063130550e-2
n = 500 , left side = 2.77258872223995e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487708277558e-2
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.68355013605960e-1
n = 20 , left side = 9.78605569036922e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.25746240846287e-1
n = 50 , left side = 3.38868135786705e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.07534542658639e-1
n = 100 , left side = 1.54044053860309e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.45955946139691e-2
n = 200 , left side = 7.31683725369431e-3
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.33938408649604e-2
n = 500 , left side = 2.83424719393494e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.18871123560609e-2
```

x^3

```
n = 10 , left side = 1.73192000431426e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.43035765585412e-1
n = 20 , left side = 1.03864925521532e-1
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.19741872228447e-1
n = 50 , left side = 3.05073733511566e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.10913982886153e-1
n = 100 , left side = 1.27681795752464e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.72318204247536e-2
n = 200 , left side = 5.78399942625288e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.49266786924019e-2
n = 500 , left side = 2.17239948281706e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.25489600671787e-2
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.35970411320625e-1
n = 20 , left side = 9.63498090064417e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.27256988743537e-1
n = 50 , left side = 2.41914336230855e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.17229922614224e-1
n = 100 , left side = 9.37035404303910e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.06296459569609e-2
n = 200 , left side = 4.05904957310241e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.66516285455523e-2
n = 500 , left side = 1.47973714572865e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.32416224042671e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.19260700953333e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.96967065063505e-1
n = 20 , left side = 3.73465208237525e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.86260276926226e-1
n = 50 , left side = 2.80162956157206e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.38619726675737e-1
n = 100 , left side = 6.32905221145845e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.93670947788542e-2
n = 200 , left side = 2.12043953336508e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.04986341653182e-2
n = 500 , left side = 6.54808182457762e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46558787317500e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/4, q = 1

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 8.10134985303516e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.35214267486486e-1
n = 20 , left side = 1.68560763315217e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.06750721418457e-1
n = 50 , left side = 1.97802106438832e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39443335172921e-1
n = 100 , left side = 4.80026592954430e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.95199734070456e-2
n = 200 , left side = 1.19239646471425e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05914384721833e-2
n = 500 , left side = 1.90449720897101e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47023145779061e-2
```

x

```
n = 10 , left side = 4.91637605442458e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.67064005472592e-1
n = 20 , left side = 3.39394250680042e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20212855243179e-1
n = 50 , left side = 1.64890433890230e-6
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41419707332971e-1
n = 100 , left side = 5.86114490275236e-12
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999941389e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

x^2

```
n = 10 , left side = 5.25230782287648e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.63704687788073e-1
n = 20 , left side = 2.83373415030339e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.95269456246945e-1
n = 50 , left side = 5.39457664221732e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.36026779595092e-1
n = 100 , left side = 1.34928057788158e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.86507194221184e-2
n = 200 , left side = 3.37320146703013e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.03733579719517e-2
n = 500 , left side = 5.39712234724488e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46673883265233e-2
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.34004315388468e-1
n = 20 , left side = 4.36057626242193e-2
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.80001035125760e-1
n = 50 , left side = 8.09259320656272e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33328763030747e-1
n = 100 , left side = 2.02392086959333e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.79760791304067e-2
n = 200 , left side = 5.05980220054492e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02046978986003e-2
n = 500 , left side = 8.09568352087009e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46404027147871e-2
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.15174792723276e-1
n = 20 , left side = 4.67481413489399e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.76858656401039e-1
n = 50 , left side = 8.21282675171919e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33208529485590e-1
n = 100 , left side = 2.03145927015694e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.79685407298431e-2
n = 200 , left side = 5.06451370153385e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.02042267485014e-2
n = 500 , left side = 8.09688966512678e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46403906533445e-2
```

x^{10}

```
n = 10 , left side = 7.01207124827065e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.46107053534131e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.03449327325345e-1
n = 50 , left side = 1.42480124701184e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39996554990298e-1
n = 100 , left side = 2.63178146244861e-4
```

```
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.97368218537551e-2
        n = 200 , left side = 6.08599933529959e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06498181253018e-2
        n = 500 , left side = 9.52678518000342e-6
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.47118327648158e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 5.33369660315088e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.62890799985329e-1
        n = 20 , left side = 3.23728371506258e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.91233960599353e-1
        n = 50 , left side = 1.39366391997124e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.27484717037597e-1
        n = 100 , left side = 7.14621856758857e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.28537814324114e-2
        n = 200 , left side = 3.61961230894126e-3
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.70910658097135e-2
        n = 500 , left side = 1.45930076253686e-3
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.32620587874589e-2
```

$$x$$

```
        n = 10 , left side = 1.29071817455777e-1
                1/n^(1/2) = 3.16227766016838e-1
                difference = 1.87155948561061e-1
        n = 20 , left side = 6.92514035886481e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 1.54355394161331e-1
        n = 50 , left side = 2.77258876437841e-2
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.13695468593525e-1
        n = 100 , left side = 1.38629438314646e-2
                1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 8.61370561685354e-2
n = 200 , left side = 6.93147191573251e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.37792062029222e-2
n = 500 , left side = 2.77258876629327e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19487707837025e-2
```

x^2

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.38836852498031e-1
n = 20 , left side = 8.30737213816240e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.40533076368355e-1
n = 50 , left side = 2.99438930027937e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.11477463234516e-1
n = 100 , left side = 1.44174451738843e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.55825548261157e-2
n = 200 , left side = 7.07009725133750e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.36405808673172e-2
n = 500 , left side = 2.79476881998975e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.19265907300060e-2
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.34520925999240e-1
n = 20 , left side = 7.48642399521749e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.48742557797804e-1
n = 50 , left side = 2.42632851043290e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.17158071132980e-1
n = 100 , left side = 1.12466925545658e-2
          1/n^(1/2) = 1.00000000000000e-1
          difference = 8.87533074454342e-2
n = 200 , left side = 5.40875852362388e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.53019195950309e-2
n = 500 , left side = 2.11285351660367e-3
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.26085060333921e-2
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 1.48440587947144e-1
n = 20 , left side = 6.03397370785075e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.63267060671471e-1
n = 50 , left side = 1.74893080184918e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.23932048218818e-1
n = 100 , left side = 7.79966635748697e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.22003336425130e-2
n = 200 , left side = 3.67816819644864e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.70325099222061e-2
n = 500 , left side = 1.41984974971847e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33015098002773e-2
```

x^{10}

```
n = 10 , left side = 7.68027797084298e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.39424986308408e-1
n = 20 , left side = 9.76146773173466e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.13845330018244e-1
n = 50 , left side = 1.13068528957820e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40290670947731e-1
n = 100 , left side = 3.88474877995726e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96115251220043e-2
n = 200 , left side = 1.62038602246220e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05486395164085e-2
n = 500 , left side = 5.81892063837631e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46631703436120e-2
```

```
x0 = 1/2, Power = 1/2, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96445247579275e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.96583241258910e-1
n = 20 , left side = 1.48888789279412e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.08717918822038e-1
n = 50 , left side = 6.77605354912070e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34645302688189e-1
n = 100 , left side = 3.52568356510685e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.64743164348932e-2
n = 200 , left side = 1.79801315131500e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.89126649673397e-2
n = 500 , left side = 7.27768804897111e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.39935907450987e-2
```

$$x$$

```
n = 10 , left side = 6.38935662496244e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.52334199767214e-1
n = 20 , left side = 3.46235470985199e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88983250651459e-1
n = 50 , left side = 1.38629429714340e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27558413265876e-1
n = 100 , left side = 6.93147149063511e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30685285093649e-2
n = 200 , left side = 3.46573574531772e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72449423733370e-2
n = 500 , left side = 1.38629429812720e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33350652518686e-2
```

$$x^2$$

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.14996570848155e-1
n = 20 , left side = 4.48623512045705e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.78744446545408e-1
n = 50 , left side = 1.55044047114581e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.25916951525851e-1
n = 100 , left side = 7.34183692697737e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.26581630730226e-2
n = 200 , left side = 3.56832710440319e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.71423510142516e-2
n = 500 , left side = 1.40270891558075e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33186506344150e-2
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.07176585875148e-1
n = 20 , left side = 4.22970110547811e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.81309786695198e-1
n = 50 , left side = 1.29223379237350e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.28499018313574e-1
n = 100 , left side = 5.82201903348833e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.41779809665117e-2
n = 200 , left side = 2.75417225524147e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.79565058634133e-2
n = 500 , left side = 1.06440558786389e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.36569539621319e-2
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.13686881335438e-1
n = 20 , left side = 3.49981874860216e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88608610263957e-1
```

```
n = 50 , left side = 9.52960631552958e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.31891749921780e-1
n = 100 , left side = 4.09764755001929e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.59023524499807e-2
n = 200 , left side = 1.88876104704880e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.88219170716060e-2
n = 500 , left side = 7.17895958025183e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40034635919706e-2
```

$$x^{10}$$

```
n = 10 , left side = 4.39432749437958e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.72284491073042e-1
n = 20 , left side = 5.59881198565948e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.18007985764319e-1
n = 50 , left side = 6.58122885628435e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40763233351681e-1
n = 100 , left side = 2.17135216419696e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.97828647835803e-2
n = 200 , left side = 8.67799400496487e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06238981786051e-2
n = 500 , left side = 3.00238003038830e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46913357496919e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/2, q = 1

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245119e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.97369430192326e-1
n = 20 , left side = 3.43036193768762e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20176435812291e-1
n = 50 , left side = 5.15745217625541e-4
```

```
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40905611019684e-1
n = 100 , left side = 1.28085535782807e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98719144642172e-2
n = 200 , left side = 3.19697272262998e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06787083914285e-2
n = 500 , left side = 5.11285838666886e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47162466916091e-2
```

x

```
n = 10 , left side = 3.03097878388953e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.13196787232948e-1
n = 20 , left side = 1.79813965206499e-5
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23588816353458e-1
n = 50 , left side = 5.04973840520506e-12
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356232260e-1
n = 100 , left side = 1.11022302462516e-16
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99999999999999e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 5.55111512312578e-17
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499957e-2
```

x^2

```
n = 10 , left side = 3.13288100022530e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.84898956014585e-1
n = 20 , left side = 9.02981956494553e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.14576978185033e-1
n = 50 , left side = 1.44928066358080e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39972075573729e-1
n = 100 , left side = 3.62320167826280e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.96376798321737e-2
n = 200 , left side = 9.05800419565561e-5
```

```
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06200980766982e-2
n = 500 , left side = 1.44928067130623e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47068667432827e-2
```

x^3

```
n = 10 , left side = 4.78600213916086e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.68367744625229e-1
n = 20 , left side = 1.35520533206201e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.10054744429359e-1
n = 50 , left side = 2.17392099772531e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39247435239584e-1
n = 100 , left side = 5.43480251739309e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94565197482607e-2
n = 200 , left side = 1.35870062934806e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05748080557199e-2
n = 500 , left side = 2.17392100695102e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46996203399263e-2
```

x^4

```
n = 10 , left side = 5.14533906505907e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.64774375366247e-1
n = 20 , left side = 1.38732244570932e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.09733573292886e-1
n = 50 , left side = 2.18227896612364e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.39239077271186e-1
n = 100 , left side = 5.44002624822695e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.94559973751773e-2
n = 200 , left side = 1.35902711252578e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.05747754074022e-2
n = 500 , left side = 2.17400458664835e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.46996195041293e-2
```

$$x^{10}$$

```
n = 10 , left side = 2.39574413183785e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.92270324698459e-1
n = 20 , left side = 2.97086004062642e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20635937709353e-1
n = 50 , left side = 2.83599622557975e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41137756614752e-1
n = 100 , left side = 6.54249762594573e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99345750237405e-2
n = 200 , left side = 1.60297404174447e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06946483782373e-2
n = 500 , left side = 2.55030753047421e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47188092424653e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 3.15884348850566e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.84639331131781e-1
n = 20 , left side = 1.69988381319672e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.06607959618012e-1
n = 50 , left side = 7.10929624048973e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.34312059996820e-1
n = 100 , left side = 3.60940309324842e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.63905969067516e-2
n = 200 , left side = 1.81874048780928e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.88919376308455e-2
n = 500 , left side = 7.30913664388266e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.39904458856075e-2
```

x

```
n = 10 , left side = 6.92279510900182e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.46999814926820e-1
n = 20 , left side = 3.46421335720477e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.88964664177931e-1
n = 50 , left side = 1.38568544082612e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.27564501829048e-1
n = 100 , left side = 6.92842720413067e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.30715727958693e-2
n = 200 , left side = 3.46421360206539e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72464645165894e-2
n = 500 , left side = 1.38568544082618e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33356741091696e-2
```

x^2

```
n = 10 , left side = 8.55451218222509e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.30682644194587e-1
n = 20 , left side = 3.87308178004870e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.84875979949492e-1
n = 50 , left side = 1.45110441151024e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.26910312122207e-1
n = 100 , left side = 7.09197463084094e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.29080253691591e-2
n = 200 , left side = 3.50510045874292e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.72055776599118e-2
n = 500 , left side = 1.39222733789462e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.33291322121012e-2
```

x^3

```
n = 10 , left side = 7.91097899306038e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.37117976086234e-1
n = 20 , left side = 3.24567771921774e-2
```

```
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.91150020557802e-1
n = 50 , left side = 1.13958230614945e-2
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.30025533175815e-1
n = 100 , left side = 5.44437875504283e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.45556212449572e-2
n = 200 , left side = 2.65983263805031e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.80508454806044e-2
n = 500 , left side = 1.04909882391729e-3
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.36722607260785e-2
```

x^4

```
n = 10 , left side = 6.53260321168637e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.50901733899974e-1
n = 20 , left side = 2.41899798353885e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 1.99416817914590e-1
n = 50 , left side = 7.95482775153313e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33466528485776e-1
n = 100 , left side = 3.71509170320668e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.62849082967933e-2
n = 200 , left side = 1.79412654760111e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.89165515710536e-2
n = 500 , left side = 7.02699493465395e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40186600565304e-2
```

x^{10}

```
n = 10 , left side = 1.23005431860469e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.03927222830791e-1
n = 20 , left side = 1.95443229260425e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.21652365457375e-1
n = 50 , left side = 4.11078488591595e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41010277748718e-1
n = 100 , left side = 1.66923378278077e-4
```

```
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.98330766217219e-2
        n = 200 , left side = 7.51857729315232e-5
                1/n^(1/2) = 7.07106781186548e-2
                difference = 7.06354923457232e-2
        n = 500 , left side = 2.82350791906388e-5
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.46931244708052e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 1.40292664147630e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 3.02198499602075e-1
        n = 20 , left side = 8.09536658966781e-3
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.15511431160311e-1
        n = 50 , left side = 3.49396872417307e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.37927387513136e-1
        n = 100 , left side = 1.79071372384143e-3
                1/n^(1/2) = 1.00000000000000e-1
                difference = 9.82092862761586e-2
        n = 200 , left side = 9.06435452010634e-4
                1/n^(1/2) = 7.07106781186548e-2
                difference = 6.98042426666441e-2
        n = 500 , left side = 3.65254093297129e-4
                1/n^(1/2) = 4.47213595499958e-2
                difference = 4.43561054566987e-2
```

$$x$$

```
        n = 10 , left side = 3.46541098802871e-2
                1/n^(1/2) = 3.16227766016838e-1
                difference = 2.81573656136551e-1
        n = 20 , left side = 1.73420259977516e-2
                1/n^(1/2) = 2.23606797749979e-1
                difference = 2.06264771752227e-1
        n = 50 , left side = 6.93681090501508e-3
                1/n^(1/2) = 1.41421356237310e-1
                difference = 1.34484545332294e-1
        n = 100 , left side = 3.46840545250782e-3
                1/n^(1/2) = 1.00000000000000e-1
```

```
          difference = 9.65315945474922e-2
n = 200 , left side = 1.73420272625380e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.89764753924010e-2
n = 500 , left side = 6.93681090501386e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40276784594944e-2
```

x^2

```
n = 10 , left side = 4.73903023658121e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.68837463651026e-1
n = 20 , left side = 2.05308163937205e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.03075981356259e-1
n = 50 , left side = 7.44701748385268e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.33974338753457e-1
n = 100 , left side = 3.59595709721700e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.64040429027830e-2
n = 200 , left side = 1.76609063743116e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.89445874812236e-2
n = 500 , left side = 6.98783156289906e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.40225763937059e-2
```

x^3

```
n = 10 , left side = 4.63238425467439e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.69903923470094e-1
n = 20 , left side = 1.79448446203553e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.05661953129624e-1
n = 50 , left side = 5.97784700290624e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.35443509234403e-1
n = 100 , left side = 2.79387267593101e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.72061273240690e-2
n = 200 , left side = 1.34863905139215e-3
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.93620390672626e-2
n = 500 , left side = 5.27923845514616e-4
```

```
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.41934357044812e-2
```

x^4

```
n = 10 , left side = 3.94349040023764e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.76792862014462e-1
n = 20 , left side = 1.37990548305422e-2
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.09807742919437e-1
n = 50 , left side = 4.25445841424152e-3
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.37166897823068e-1
n = 100 , left side = 1.92806775614625e-3
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.80719322438538e-2
n = 200 , left side = 9.15246967505515e-4
          1/n^(1/2) = 7.07106781186548e-2
          difference = 6.97954311511492e-2
n = 500 , left side = 3.54513590363287e-4
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.43668459596325e-2
```

x^{10}

```
n = 10 , left side = 7.27638680160743e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.08951379215231e-1
n = 20 , left side = 1.19062238971356e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22416175360265e-1
n = 50 , left side = 2.37641399649618e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41183714837660e-1
n = 100 , left side = 9.15159839724954e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99084840160275e-2
n = 200 , left side = 3.96334550487991e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06710446636060e-2
n = 500 , left side = 1.44549073568421e-5
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47069046426390e-2
```

```
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.43886557706544e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.11788900439773e-1
n = 20 , left side = 1.03630053646838e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22570497213511e-1
n = 50 , left side = 1.63624778015015e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41257731459294e-1
n = 100 , left side = 4.08320646757554e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99591679353243e-2
n = 200 , left side = 1.02034164284337e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07004747022263e-2
n = 500 , left side = 1.63234093675246e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47197272090590e-2
```

$$x$$

```
n = 10 , left side = 1.58663982219309e-5
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.16211899618616e-1
n = 20 , left side = 6.52684128965575e-10
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.23606797097295e-1
n = 50 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41421356237310e-1
n = 100 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.00000000000000e-1
          difference = 1.00000000000000e-1
n = 200 , left side = 0.000000000000000e0
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07106781186548e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47213595499958e-2
```

$$x^2$$

```
n = 10 , left side = 1.15428308402608e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.04684935176577e-1
n = 20 , left side = 2.89205247195795e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.20714745278021e-1
n = 50 , left side = 4.62728557739434e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40958627679570e-1
n = 100 , left side = 1.15682139434858e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98843178605651e-2
n = 200 , left side = 2.89205348588673e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06817575837959e-2
n = 500 , left side = 4.62728557748537e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47167322644183e-2
```

x^3

```
n = 10 , left side = 1.73200399632407e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.98907726053597e-1
n = 20 , left side = 4.33807899343377e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.19268718756545e-1
n = 50 , left side = 6.94092836609345e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40727263400700e-1
n = 100 , left side = 1.73523209152371e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98264767908476e-2
n = 200 , left side = 4.33808022881066e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06672973163666e-2
n = 500 , left side = 6.94092836614479e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47144186216296e-2
```

x^4

```
n = 10 , left side = 1.77823913197880e-2
          1/n^(1/2) = 3.16227766016838e-1
          difference = 2.98445374697050e-1
n = 20 , left side = 4.36734781351719e-3
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.19239449936462e-1
```

```
n = 50 , left side = 6.94842122375819e-4
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.40726514114934e-1
n = 100 , left side = 1.73570039512738e-4
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.98264299604873e-2
n = 200 , left side = 4.33837291856087e-5
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.06672943894691e-2
n = 500 , left side = 6.94100329461100e-6
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47144185467012e-2
```

$$x^{10}$$

```
n = 10 , left side = 4.06239089134456e-3
          1/n^(1/2) = 3.16227766016838e-1
          difference = 3.12165375125493e-1
n = 20 , left side = 6.12650024829540e-4
          1/n^(1/2) = 2.23606797749979e-1
          difference = 2.22994147725149e-1
n = 50 , left side = 8.38305099970637e-5
          1/n^(1/2) = 1.41421356237310e-1
          difference = 1.41337525727312e-1
n = 100 , left side = 2.04889255338266e-5
          1/n^(1/2) = 1.00000000000000e-1
          difference = 9.99795110744662e-2
n = 200 , left side = 5.09329964822080e-6
          1/n^(1/2) = 7.07106781186548e-2
          difference = 7.07055848190065e-2
n = 500 , left side = 8.13635935028711e-7
          1/n^(1/2) = 4.47213595499958e-2
          difference = 4.47205459140608e-2
```

---

x0 = 1/2, Power = 7/10, lamda = 1/4, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.65939350634126e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.52932296433475e-1
n = 20 , left side = 5.39175273339064e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.89052752776726e-2
n = 50 , left side = 2.66706958509516e-2
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.80020048067841e-2
n = 100 , left side = 1.39692422376505e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.58414748176992e-2
n = 200 , left side = 7.15466879542836e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.73517021515461e-2
n = 500 , left side = 2.90466167844949e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 9.99923856451483e-3
```

x

```
n = 10 , left side = 1.46960541508878e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.25656899880098e-2
n = 20 , left side = 1.28044818944893e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.22201633331434e-3
n = 50 , left side = 5.54458428059442e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.22685785179153e-3
n = 100 , left side = 2.77258872001896e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.20848298551601e-2
n = 200 , left side = 1.38629436111991e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.06434273357754e-2
n = 500 , left side = 5.54517744447935e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.35872279848497e-3
```

x^2

```
n = 10 , left side = 2.44068957215094e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -4.45427257182058e-2
n = 20 , left side = 1.73393496362237e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.05706937506581e-2
n = 50 , left side = 6.39143140576404e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 7.58386600095390e-4
n = 100 , left side = 2.98438925970291e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 9.96682445832066e-3
n = 200 , left side = 1.43924449634693e-2
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.01139259835052e-2
n = 500 , left side = 5.62989766084276e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 7.27400258212156e-3
```

x^3

```
n = 10 , left side = 2.70532081486956e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.10058499900676e-2
n = 20 , left side = 1.75303858260733e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -5.24810556491540e-2
n = 50 , left side = 5.53534166881951e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 9.31928396954068e-3
n = 100 , left side = 2.41049670707777e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 1.57057499845720e-2
n = 200 , left side = 1.12081526845386e-2
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.32982182624359e-2
n = 500 , left side = 4.28703175655951e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 8.61686848640482e-3
```

x^4

```
n = 10 , left side = 2.71811655321145e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = -7.22854238242565e-2
n = 20 , left side = 1.59700780897926e-1
          1/n^(7/10) = 1.22822802611579e-1
          difference = -3.68779782863466e-2
n = 50 , left side = 4.27867893894554e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 2.18859112682804e-2
n = 100 , left side = 1.73213915349858e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.24893255203640e-2
n = 200 , left side = 7.76000677274204e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.67463641742325e-2
n = 500 , left side = 2.90182870840223e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.00020715345621e-2
```

$$x^{10}$$

```
n = 10 , left side = 1.86850823331552e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.26754081653362e-2
n = 20 , left side = 6.58347789205075e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.69880236910715e-2
n = 50 , left side = 4.87085072187464e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.98018499358611e-2
n = 100 , left side = 1.09970741430996e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.87110096410398e-2
n = 200 , left side = 3.82804893814586e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41235660531599e-2
n = 500 , left side = 1.24276968148264e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.27796232748161e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96080052578450e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79918226239043e-1
n = 20 , left side = 2.08299179386359e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.01992884672943e-1
n = 50 , left side = 1.26071386109592e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.20655620467766e-2
n = 100 , left side = 6.81015763376169e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.30005594215880e-2
n = 200 , left side = 3.53432821873112e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.09720427282434e-2
n = 500 , left side = 1.44549650366488e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14584037392994e-2
```

x

```
n = 10 , left side = 5.68097172543791e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.42716514242509e-1
n = 20 , left side = 6.32752819000137e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.95475207115653e-2
n = 50 , left side = 2.77227554082915e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69499452494443e-2
n = 100 , left side = 1.38629435997853e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59477734555644e-2
n = 200 , left side = 6.93147180559972e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75748991413748e-2
n = 500 , left side = 2.77258872223995e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313115207244e-2
```

x^2

```
n = 10 , left side = 1.47872752410878e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 5.16534790860099e-2
n = 20 , left side = 9.78605569036922e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.49622457078869e-2
n = 50 , left side = 3.38868135786705e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.07858870790653e-2
n = 100 , left side = 1.54044053860309e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.44063116693188e-2
n = 200 , left side = 7.31683725369431e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.71895336932802e-2
n = 500 , left side = 2.83424719393494e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.00696530490294e-2
```

x^3

```
n = 10 , left side = 1.73192000431426e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.63342310654625e-2
n = 20 , left side = 1.03864925521532e-1
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.89578770900470e-2
n = 50 , left side = 3.05073733511566e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.41653273065792e-2
n = 100 , left side = 1.27681795752464e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.70425374801034e-2
n = 200 , left side = 5.78399942625288e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.87223715207216e-2
n = 500 , left side = 2.17239948281706e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07315007601473e-2
```

x^4

```
n = 10 , left side = 1.80257354696213e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.92688768006753e-2
n = 20 , left side = 9.63498090064417e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 2.64729936051373e-2
n = 50 , left side = 2.41914336230855e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.04812670346503e-2
n = 100 , left side = 9.37035404303910e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.04403630123106e-2
n = 200 , left side = 4.05904957310241e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.04473213738721e-2
n = 500 , left side = 1.47973714572865e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14241630972357e-2
```

x^{10}

```
n = 10 , left side = 1.19260700953333e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 8.02655305435547e-2
n = 20 , left side = 3.73465208237525e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.54762817878265e-2
n = 50 , left side = 2.80162956157206e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.18710710961637e-2
n = 100 , left side = 6.32905221145845e-4
```

```
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.91778118342039e-2
        n = 200 , left side = 2.12043953336508e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.42943269936380e-2
        n = 500 , left side = 6.54808182457762e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28384194247185e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 8.10134985303516e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.18512732966536e-1
        n = 20 , left side = 1.68560763315217e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.05966726280057e-1
        n = 50 , left side = 1.97802106438832e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.26946795933474e-2
        n = 100 , left side = 4.80026592954430e-4
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.93306904623953e-2
        n = 200 , left side = 1.19239646471425e-4
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.43871313005031e-2
        n = 500 , left side = 1.90449720897101e-5
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.28848552708746e-2
```

$$x$$

```
        n = 10 , left side = 4.91637605442458e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.50362470952642e-1
        n = 20 , left side = 3.39394250680042e-3
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.19428860104779e-1
        n = 50 , left side = 1.64890433890230e-6
                1/n^(7/10) = 6.46727006577358e-2
                difference = 6.46710517533969e-2
        n = 100 , left side = 5.86114490275236e-12
                1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 3.98107170494886e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 5.25230782287648e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.47003153268123e-1
n = 20 , left side = 2.83373415030339e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.44854611085451e-2
n = 50 , left side = 5.39457664221732e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.92781240155184e-2
n = 100 , left side = 1.34928057788158e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.84614364774681e-2
n = 200 , left side = 3.37320146703013e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.41690508002715e-2
n = 500 , left side = 5.39712234724488e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28499290194919e-2
```

x^3

```
n = 10 , left side = 8.22234506283697e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.17302780868518e-1
n = 20 , left side = 4.36057626242193e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.92170399873598e-2
n = 50 , left side = 8.09259320656272e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.65801074511730e-2
n = 100 , left side = 2.02392086959333e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.77867961857564e-2
n = 200 , left side = 5.05980220054492e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.40003907269200e-2
n = 500 , left side = 8.09568352087009e-5
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28229434077556e-2
```

x^4

```
n = 10 , left side = 1.01052973293562e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.84732582033261e-2
n = 20 , left side = 4.67481413489399e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.60746612626391e-2
n = 50 , left side = 8.21282675171919e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.64598739060166e-2
n = 100 , left side = 2.03145927015694e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.77792577851928e-2
n = 200 , left side = 5.06451370153385e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.39999195768211e-2
n = 500 , left side = 8.09688966512678e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28229313463131e-2
```

x^{10}

```
n = 10 , left side = 7.01207124827065e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.29405519014181e-1
n = 20 , left side = 2.01574704246336e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02665332186945e-1
n = 50 , left side = 1.42480124701184e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.32478994107239e-2
n = 100 , left side = 2.63178146244861e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95475389091049e-2
n = 200 , left side = 6.08599933529959e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44455109536215e-2
n = 500 , left side = 9.52678518000342e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28943734577843e-2
```

```
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 5.33369660315088e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.46189265465379e-1
n = 20 , left side = 3.23728371506258e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.04499654609532e-2
n = 50 , left side = 1.39366391997124e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.07360614580233e-2
n = 100 , left side = 7.14621856758857e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.26644984877612e-2
n = 200 , left side = 3.61961230894126e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.08867586380332e-2
n = 500 , left side = 1.45930076253686e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14445994804275e-2
```

$$x$$

```
n = 10 , left side = 1.29071817455777e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 7.04544140411110e-2
n = 20 , left side = 6.92514035886481e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 5.35713990229309e-2
n = 50 , left side = 2.77258876437841e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.69468130139516e-2
n = 100 , left side = 1.38629438314646e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.59477732238852e-2
n = 200 , left side = 6.93147191573251e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.75748990312420e-2
n = 500 , left side = 2.77258876629327e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01313114766711e-2
```

$$x^2$$

```
n = 10 , left side = 1.77390913518807e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 2.21353179780806e-2
n = 20 , left side = 8.30737213816240e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 3.97490812299550e-2
n = 50 , left side = 2.99438930027937e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 3.47288076549421e-2
n = 100 , left side = 1.44174451738843e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.53932718814654e-2
n = 200 , left side = 7.07009725133750e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.74362736956370e-2
n = 500 , left side = 2.79476881998975e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.01091314229746e-2
```

x^3

```
n = 10 , left side = 1.81706840017598e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.78193914792899e-2
n = 20 , left side = 7.48642399521749e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 4.79585626594041e-2
n = 50 , left side = 2.42632851043290e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.04094155534067e-2
n = 100 , left side = 1.12466925545658e-2
          1/n^(7/10) = 3.98107170553497e-2
          difference = 2.85640245007839e-2
n = 200 , left side = 5.40875852362388e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 1.90976124233506e-2
n = 500 , left side = 2.11285351660367e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.07910467263606e-2
```

x^4

```
n = 10 , left side = 1.67787178069694e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 3.17390534271940e-2
n = 20 , left side = 6.03397370785075e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 6.24830655330716e-2
```

```
n = 50 , left side = 1.74893080184918e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.71833926392440e-2
n = 100 , left side = 7.79966635748697e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.20110506978628e-2
n = 200 , left side = 3.67816819644864e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.08282027505259e-2
n = 500 , left side = 1.41984974971847e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.14840504932459e-2
```

$$x^{10}$$

```
n = 10 , left side = 7.68027797084298e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.22723451788458e-1
n = 20 , left side = 9.76146773173466e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.13061334879844e-1
n = 50 , left side = 1.13068528957820e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.35420153681576e-2
n = 100 , left side = 3.88474877995726e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94222421773540e-2
n = 200 , left side = 1.62038602246220e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43443323447283e-2
n = 500 , left side = 5.81892063837631e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28457110365806e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.96445247579275e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.79881706738961e-1
n = 20 , left side = 1.48888789279412e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.07933923683638e-1
n = 50 , left side = 6.77605354912070e-3
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.78966471086151e-2
n = 100 , left side = 3.52568356510685e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.62850334902429e-2
n = 200 , left side = 1.79801315131500e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27083577956595e-2
n = 500 , left side = 7.27768804897111e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.21761314380672e-2
```

x

```
n = 10 , left side = 6.38935662496244e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.35632665247264e-1
n = 20 , left side = 3.46235470985199e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.81992555130592e-2
n = 50 , left side = 1.38629429714340e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.08097576863018e-2
n = 100 , left side = 6.93147149063511e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.28792455647146e-2
n = 200 , left side = 3.46573574531772e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10406352016568e-2
n = 500 , left side = 1.38629429812720e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15176059448371e-2
```

x^2

```
n = 10 , left side = 1.01231195168683e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.82950363282052e-2
n = 20 , left side = 4.48623512045705e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 7.79604514070085e-2
n = 50 , left side = 1.55044047114581e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 4.91682959462776e-2
n = 100 , left side = 7.34183692697737e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.24688801283724e-2
n = 200 , left side = 3.56832710440319e-3
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.09380438425713e-2
n = 500 , left side = 1.40270891558075e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15011913273836e-2
```

x^3

```
n = 10 , left side = 1.09051180141690e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.04750513551982e-2
n = 20 , left side = 4.22970110547811e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.05257915567980e-2
n = 50 , left side = 1.29223379237350e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.17503627340007e-2
n = 100 , left side = 5.82201903348833e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.39886980218614e-2
n = 200 , left side = 2.75417225524147e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.17521986917330e-2
n = 500 , left side = 1.06440558786389e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.18394946551004e-2
```

x^4

```
n = 10 , left side = 1.02540884681400e-1
          1/n^(7/10) = 1.99526231496888e-1
          difference = 9.69853468154883e-2
n = 20 , left side = 3.49981874860216e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.78246151255575e-2
n = 50 , left side = 9.52960631552958e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.51430943422062e-2
n = 100 , left side = 4.09764755001929e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.57130695053304e-2
n = 200 , left side = 1.88876104704880e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.26176098999257e-2
n = 500 , left side = 7.17895958025183e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.21860042849391e-2
```

$$x^{10}$$

```
n = 10 , left side = 4.39432749437958e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.55582956553092e-1
n = 20 , left side = 5.59881198565948e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.17223990625920e-1
n = 50 , left side = 6.58122885628435e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.40145777721073e-2
n = 100 , left side = 2.17135216419696e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.95935818389300e-2
n = 200 , left side = 8.67799400496487e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44195910069249e-2
n = 500 , left side = 3.00238003038830e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28738764426604e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.88583358245119e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.80667895672376e-1
n = 20 , left side = 3.43036193768762e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19392440673891e-1
n = 50 , left side = 5.15745217625541e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.41569554401102e-2
n = 100 , left side = 1.28085535782807e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96826315195669e-2
n = 200 , left side = 3.19697272262998e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44744012197482e-2
n = 500 , left side = 5.11285838666886e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28987873845777e-2
```

x

```
n = 10 , left side = 3.03097878388953e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.96495252712998e-1
n = 20 , left side = 1.79813965206499e-5
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22804821215058e-1
n = 50 , left side = 5.04973840520506e-12
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006526860e-2
n = 100 , left side = 1.11022302462516e-16
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553496e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 5.55111512312578e-17
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 3.13288100022530e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.68197421494635e-1
n = 20 , left side = 9.02981956494553e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.13792983046634e-1
n = 50 , left side = 1.44928066358080e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.32234199941550e-2
n = 100 , left side = 3.62320167826280e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.94483968875235e-2
n = 200 , left side = 9.05800419565561e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44157909050179e-2
n = 500 , left side = 1.44928067130623e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28894074362513e-2
```

x^3

```
n = 10 , left side = 4.78600213916086e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.51666210105279e-1
n = 20 , left side = 1.35520533206201e-2
```

```
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.09270749290959e-1
n = 50 , left side = 2.17392099772531e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24987796600104e-2
n = 100 , left side = 5.43480251739309e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92672368036104e-2
n = 200 , left side = 1.35870062934806e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43705008840397e-2
n = 500 , left side = 2.17392100695102e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28821610328948e-2
```

x^4

```
n = 10 , left side = 5.14533906505907e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.48072840846297e-1
n = 20 , left side = 1.38732244570932e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.08949578154486e-1
n = 50 , left side = 2.18227896612364e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.24904216916121e-2
n = 100 , left side = 5.44002624822695e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.92667144305270e-2
n = 200 , left side = 1.35902711252578e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.43704682357219e-2
n = 500 , left side = 2.17400458664835e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28821601970978e-2
```

x^{10}

```
n = 10 , left side = 2.39574413183785e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.75568790178510e-1
n = 20 , left side = 2.97086004062642e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19851942570953e-1
n = 50 , left side = 2.83599622557975e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.43891010351778e-2
n = 100 , left side = 6.54249762594573e-5
```

```
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.97452920790903e-2
        n = 200 , left side = 1.60297404174447e-5
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.44903412065571e-2
        n = 500 , left side = 2.55030753047421e-6
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.29013499354338e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 10 , left side = 3.15884348850566e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.67937796611831e-1
        n = 20 , left side = 1.69988381319672e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 1.05823964479612e-1
        n = 50 , left side = 7.10929624048973e-3
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.75634044172460e-2
        n = 100 , left side = 3.60940309324842e-3
                1/n^(7/10) = 3.98107170553497e-2
                difference = 3.62013139621013e-2
        n = 200 , left side = 1.81874048780928e-3
                1/n^(7/10) = 2.45063709469745e-2
                difference = 2.26876304591652e-2
        n = 500 , left side = 7.30913664388266e-4
                1/n^(7/10) = 1.29039002429643e-2
                difference = 1.21729865785761e-2
```

$$x$$

```
        n = 10 , left side = 6.92279510900182e-2
                1/n^(7/10) = 1.99526231496888e-1
                difference = 1.30298280406870e-1
        n = 20 , left side = 3.46421335720477e-2
                1/n^(7/10) = 1.22822802611579e-1
                difference = 8.81806690395313e-2
        n = 50 , left side = 1.38568544082612e-2
                1/n^(7/10) = 6.46727006577358e-2
                difference = 5.08158462494745e-2
        n = 100 , left side = 6.92842720413067e-3
                1/n^(7/10) = 3.98107170553497e-2
```

```
          difference = 3.28822898512191e-2
n = 200 , left side = 3.46421360206539e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10421573449091e-2
n = 500 , left side = 1.38568544082618e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15182148021381e-2
```

x^2

```
n = 10 , left side = 8.55451218222509e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.13981109674637e-1
n = 20 , left side = 3.87308178004870e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 8.40919848110921e-2
n = 50 , left side = 1.45110441151024e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.01616565426334e-2
n = 100 , left side = 7.09197463084094e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.27187424245088e-2
n = 200 , left side = 3.50510045874292e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.10012704882316e-2
n = 500 , left side = 1.39222733789462e-3
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.15116729050697e-2
```

x^3

```
n = 10 , left side = 7.91097899306038e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.20416441566284e-1
n = 20 , left side = 3.24567771921774e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.03660254194017e-2
n = 50 , left side = 1.13958230614945e-2
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.32768775962413e-2
n = 100 , left side = 5.44437875504283e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.43663383003069e-2
n = 200 , left side = 2.65983263805031e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.18465383089242e-2
n = 500 , left side = 1.04909882391729e-3
```

```
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.18548014190470e-2
```

x^4

```
n = 10 , left side = 6.53260321168637e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.34200199380024e-1
n = 20 , left side = 2.41899798353885e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 9.86328227761906e-2
n = 50 , left side = 7.95482775153313e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.67178729062026e-2
n = 100 , left side = 3.71509170320668e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.60956253521431e-2
n = 200 , left side = 1.79412654760111e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27122443993734e-2
n = 500 , left side = 7.02699493465395e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.22012007494989e-2
```

x^{10}

```
n = 10 , left side = 1.23005431860469e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.87225688310841e-1
n = 20 , left side = 1.95443229260425e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.20868370318975e-1
n = 50 , left side = 4.11078488591595e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.42616221691442e-2
n = 100 , left side = 1.66923378278077e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96437936770717e-2
n = 200 , left side = 7.51857729315232e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44311851740430e-2
n = 500 , left side = 2.82350791906388e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28756651637737e-2
```

```
x0 = 1/2, Power = 7/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 1.40292664147630e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.85496965082125e-1
n = 20 , left side = 8.09536658966781e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.14727436021911e-1
n = 50 , left side = 3.49396872417307e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.11787319335627e-2
n = 100 , left side = 1.79071372384143e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.80200033315083e-2
n = 200 , left side = 9.06435452010634e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.35999354949639e-2
n = 500 , left side = 3.65254093297129e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25386461496672e-2
```

$$x$$

```
n = 10 , left side = 3.46541098802871e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.64872121616601e-1
n = 20 , left side = 1.73420259977516e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.05480776613827e-1
n = 50 , left side = 6.93681090501508e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.77358897527207e-2
n = 100 , left side = 3.46840545250782e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.63423116028419e-2
n = 200 , left side = 1.73420272625380e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27721682207207e-2
n = 500 , left side = 6.93681090501386e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.22102191524629e-2
```

$$x^2$$

```
n = 10 , left side = 4.73903023658121e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.52135929131076e-1
n = 20 , left side = 2.05308163937205e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.02291986217859e-1
n = 50 , left side = 7.44701748385268e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.72256831738831e-2
n = 100 , left side = 3.59595709721700e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.62147599581327e-2
n = 200 , left side = 1.76609063743116e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.27402803095433e-2
n = 500 , left side = 6.98783156289906e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.22051170866744e-2
```

x^3

```
n = 10 , left side = 4.63238425467439e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.53202388950144e-1
n = 20 , left side = 1.79448446203553e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.04877957991224e-1
n = 50 , left side = 5.97784700290624e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 5.86948536548295e-2
n = 100 , left side = 2.79387267593101e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.70168443794187e-2
n = 200 , left side = 1.34863905139215e-3
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.31577318955823e-2
n = 500 , left side = 5.27923845514616e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.23759763974497e-2
```

x^4

```
n = 10 , left side = 3.94349040023764e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.60091327494512e-1
n = 20 , left side = 1.37990548305422e-2
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.09023747781037e-1
```

```
n = 50 , left side = 4.25445841424152e-3
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.04182422434942e-2
n = 100 , left side = 1.92806775614625e-3
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.78826492992035e-2
n = 200 , left side = 9.15246967505515e-4
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.35911239794690e-2
n = 500 , left side = 3.54513590363287e-4
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.25493866526010e-2
```

$$x^{10}$$

```
n = 10 , left side = 7.27638680160743e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.92249844695281e-1
n = 20 , left side = 1.19062238971356e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21632180221865e-1
n = 50 , left side = 2.37641399649618e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.44350592580861e-2
n = 100 , left side = 9.15159839724954e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97192010713772e-2
n = 200 , left side = 3.96334550487991e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44667374919257e-2
n = 500 , left side = 1.44549073568421e-5
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28894453356075e-2
```

---

x0 = 1/2, Power = 7/10, lamda = 1, q = 1

$$x^{\frac{1}{3}}$$

```
n = 10 , left side = 4.43886557706544e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.95087365919823e-1
n = 20 , left side = 1.03630053646838e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.21786502075111e-1
n = 50 , left side = 1.63624778015015e-4
```

```
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.45090758797207e-2
n = 100 , left side = 4.08320646757554e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97698849906740e-2
n = 200 , left side = 1.02034164284337e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44961675305461e-2
n = 500 , left side = 1.63234093675246e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29022679020276e-2
```

x

```
n = 10 , left side = 1.58663982219309e-5
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.99510365098666e-1
n = 20 , left side = 6.52684128965575e-10
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22822801958895e-1
n = 50 , left side = 0.000000000000000e0
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.46727006577358e-2
n = 100 , left side = 0.000000000000000e0
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.98107170553497e-2
n = 200 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45063709469745e-2
n = 500 , left side = 0.000000000000000e0
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29039002429643e-2
```

x^2

```
n = 10 , left side = 1.15428308402608e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.87983400656627e-1
n = 20 , left side = 2.89205247195795e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.19930750139621e-1
n = 50 , left side = 4.62728557739434e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.42099720999963e-2
n = 100 , left side = 1.15682139434858e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96950349159149e-2
n = 200 , left side = 2.89205348588673e-5
```

```
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44774504121156e-2
n = 500 , left side = 4.62728557748537e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28992729573868e-2
```

x^3

```
n = 10 , left side = 1.73200399632407e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.82206191533647e-1
n = 20 , left side = 4.33807899343377e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.18484723618145e-1
n = 50 , left side = 6.94092836609345e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.39786078211264e-2
n = 100 , left side = 1.73523209152371e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96371938461974e-2
n = 200 , left side = 4.33808022881066e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44629901446864e-2
n = 500 , left side = 6.94092836614479e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28969593145982e-2
```

x^4

```
n = 10 , left side = 1.77823913197880e-2
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.81743840177100e-1
n = 20 , left side = 4.36734781351719e-3
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.18455454798062e-1
n = 50 , left side = 6.94842122375819e-4
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.39778585353599e-2
n = 100 , left side = 1.73570039512738e-4
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.96371470158370e-2
n = 200 , left side = 4.33837291856087e-5
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.44629872177889e-2
n = 500 , left side = 6.94100329461100e-6
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.28969592396697e-2
```

```
n = 10 , left side = 4.06239089134456e-3
          1/n^(7/10) = 1.99526231496888e-1
          difference = 1.95463840605543e-1
n = 20 , left side = 6.12650024829540e-4
          1/n^(7/10) = 1.22822802611579e-1
          difference = 1.22210152586750e-1
n = 50 , left side = 8.38305099970637e-5
          1/n^(7/10) = 6.46727006577358e-2
          difference = 6.45888701477387e-2
n = 100 , left side = 2.04889255338266e-5
          1/n^(7/10) = 3.98107170553497e-2
          difference = 3.97902281298159e-2
n = 200 , left side = 5.09329964822080e-6
          1/n^(7/10) = 2.45063709469745e-2
          difference = 2.45012776473263e-2
n = 500 , left side = 8.13635935028711e-7
          1/n^(7/10) = 1.29039002429643e-2
          difference = 1.29030866070293e-2
```

12 Real-valued neural network approximation based on the q-deformed and λ-parametrized Hyperbolic Tangent - part 2

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
               ␣
 ↪print("-------------------------------------------------------------------------------")
                print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
 ↪str(lamda) + ",  q = " + str(q))
               ␣
 ↪print("-------------------------------------------------------------------------------")

                #the activation function
                phi(x) =  (e^(lamda*x)-q*e^(-lamda*x))/
 ↪(e^(lamda*x)+q*e^(-lamda*x))   #formula  18.1

                #
                G(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 18.9

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [2000, 5000]:
```

```
                        #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                        #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(L(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 9.78384108846653e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01278134147511e-1
          n = 5000 , left side = 3.91803600351293e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.72881573712221e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 9.82128243529390e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01274390012828e-1
          n = 5000 , left side = 3.92402662610758e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.72875583089626e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 4.88765734909080e-4
                    1/n^(3/10) = 1.02256518256357e-1
```

```
                 difference = 1.01767752521448e-1
        n = 5000 , left side = 1.95833577701698e-4
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.74841273938717e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 4.91490676762352e-4
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.01765027579595e-1
        n = 5000 , left side = 1.96269568849661e-4
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.74836914027237e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 1.19260542763566e-6
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.02255325650930e-1
        n = 5000 , left side = 1.90817055045756e-7
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.76797701545183e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 1.19260542796873e-6
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.02255325650929e-1
        n = 5000 , left side = 1.90817054490644e-7
                 1/n^(3/10) = 7.76799609715734e-2
                 difference = 7.76797701545189e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 4.89638706925866e-4
                 1/n^(3/10) = 1.02256518256357e-1
                 difference = 1.01766879549431e-1
        n = 5000 , left side = 1.95973196964960e-4
```

```
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.74839877746084e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 4.90618935763076e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.01765899320594e-1
        n = 5000 , left side = 1.96130033619624e-4
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.74838309379538e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 2.44701705652384e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02011816550705e-1
        n = 5000 , left side = 9.79677681450797e-5
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.75819932034283e-2
```

$$\cos(x)$$

```
        n = 2000 , left side = 2.45427135862286e-4
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02011091120495e-1
        n = 5000 , left side = 9.80838370118198e-5
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.75818771345616e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
        n = 2000 , left side = 3.20260086117408e-7
                1/n^(3/10) = 1.02256518256357e-1
                difference = 1.02256197996271e-1
        n = 5000 , left side = 5.12400810670499e-8
                1/n^(3/10) = 7.76799609715734e-2
                difference = 7.76799097314923e-2
```

$$\cos(x)$$

```
n = 2000 , left side = 3.20237314221927e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256198019043e-1
n = 5000 , left side = 5.12395328389204e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799097320405e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 2.44927550096308e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02011590706261e-1
n = 5000 , left side = 9.79606247285547e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75820003468448e-2
```

$$\cos(x)$$

```
n = 2000 , left side = 2.45216626713507e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02011301629644e-1
n = 5000 , left side = 9.80068816603952e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75819540899130e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
n = 2000 , left side = 1.22509259644299e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02134008996713e-1
n = 5000 , left side = 4.90340684149437e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76309269031584e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 1.22734955049442e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02133783301308e-1
          n = 5000 , left side = 4.90701470647892e-5
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76308908245086e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 2.12255174658615e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256306001183e-1
          n = 5000 , left side = 1.90105314823441e-8
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799419610419e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 7.88483400793183e-9
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256510371523e-1
          n = 5000 , left side = 1.37092714957987e-8
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799472623019e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 9.78384108846653e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.13822956661512e-2
          n = 5000 , left side = 3.91803600351293e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.37503320233797e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 9.82128243529390e-4
                    1/n^(1/2) = 2.23606797749979e-2
```

```
                    difference = 2.13785515314685e-2
          n = 5000 , left side = 3.92402662610758e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.37497329611202e-2


--------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 2000 , left side = 4.88765734909080e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.18719140400888e-2
          n = 5000 , left side = 1.95833577701698e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.39463020460293e-2
```

$$\cos(x)$$

```
          n = 2000 , left side = 4.91490676762352e-4
                    1/n^(1/2) = 2.23606797749979e-2
                    difference = 2.18691890982355e-2
          n = 5000 , left side = 1.96269568849661e-4
                    1/n^(1/2) = 1.41421356237310e-2
                    difference = 1.39458660548813e-2
```

[1]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [x^(1/3), x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for power in powers:
    ##########################################################
    for lamda in lamdas:  #going over each lamda value
```

```
    ##########################################################
        for q in qs:      #going over each q value
        ##########################################################
            print()
            print()
           ␣
↪print("-------------------------------------------------------------------------------")
            print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
           ␣
↪print("-------------------------------------------------------------------------------")


            #the activation function
            phi(x) =  (e^(lamda*x)-q*e^(-lamda*x))/(e^(lamda*x)+q*e^(-lamda*x)) ␣
↪ #formula  18.1

            #
            G(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 18.9

            ##########################################################
            for i in range(len(funcs)):
            ##########################################################
                f(x)=funcs[i]
                show(f(x))
                for n in [2000, 5000]:
                    #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                    #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                    #leftSide = abs(L(n,f,x0)-f(x0))
                    leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                    val1 = n
                    val2 = leftSide.n()
                    val3 = 1/(n^power).n()
                    print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.31673691973467e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01524844564384e-1
n = 5000 , left side = 2.93115579032222e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.73868453925412e-2
```

x

```
n = 2000 , left side = 1.38629436111959e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.00870223895238e-1
n = 5000 , left side = 5.54517744448035e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.71254432271253e-2
```

x^2

```
n = 2000 , left side = 1.39158937464257e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.00864928881715e-1
n = 5000 , left side = 5.55364946611570e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.71245960249618e-2
```

x^3

```
n = 2000 , left side = 1.04767998407182e-3
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01208838272285e-1
n = 5000 , left side = 4.17160179930071e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.72628007916433e-2
```

x^4

```
n = 2000 , left side = 7.01123176443816e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01555395079913e-1
n = 5000 , left side = 2.78531814462968e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.74014291571104e-2
```

x^{10}

```
n = 2000 , left side = 2.80227731768255e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02228495483180e-1
```

```
          n = 5000 , left side = 1.09803560959030e-5
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76689806154775e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 3.65410972395064e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01891107283962e-1
          n = 5000 , left side = 1.46489688196305e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.75334712833771e-2
```

$$x$$

```
          n = 2000 , left side = 6.93147180559794e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01563371075798e-1
          n = 5000 , left side = 2.77258872223740e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.74027020993496e-2
```

$$x^2$$

```
          n = 2000 , left side = 6.97000835040928e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01559517421316e-1
          n = 5000 , left side = 2.77875456940857e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.74020855146325e-2
```

$$x^3$$

```
          n = 2000 , left side = 5.25648214541347e-4
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.01730870041816e-1
          n = 5000 , left side = 2.08869501477027e-4
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.74710914700964e-2
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871171e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01904149432486e-1
n = 5000 , left side = 1.39555255115567e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75404057164578e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079194256e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02242295748438e-1
n = 5000 , left side = 5.52404203315975e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76744369295402e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097031422e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255328315387e-1
n = 5000 , left side = 1.90387245635470e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797705843277e-2
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256518256357e-1
n = 5000 , left side = 0.000000000000000e0
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799609715734e-2
```

$$x^2$$

```
n = 2000 , left side = 3.37320146703846e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02253145054890e-1
n = 5000 , left side = 5.39712234737255e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76794212593386e-2
```

$$x^3$$

```
n = 2000 , left side = 5.05980220055768e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02251458454157e-1
n = 5000 , left side = 8.09568352244661e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76791514032211e-2
```

$$x^4$$

```
n = 2000 , left side = 5.05984931552239e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02251458407042e-1
n = 5000 , left side = 8.09569558321566e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76791514020151e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.93100186560341e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02255925156171e-1
n = 5000 , left side = 9.48752485302982e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76798660963249e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/2, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383738788e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01890238872619e-1
n = 5000 , left side = 1.46628824907791e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75333321466656e-2
```

$$x$$

```
n = 2000 , left side = 6.93147191573318e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01563371064784e-1
n = 5000 , left side = 2.77258876629438e-4
```

```
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74027020949439e-2
```

$$x^2$$

```
n = 2000 , left side = 6.94533444929146e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01561984811428e-1
n = 5000 , left side = 2.77480677166264e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74024802944071e-2
```

$$x^3$$

```
n = 2000 , left side = 5.21941990297342e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01734576266060e-1
n = 5000 , left side = 2.08277000138785e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.74716839714346e-2
```

$$x^4$$

```
n = 2000 , left side = 3.48657415094378e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01907860841263e-1
n = 5000 , left side = 1.38962422999100e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75409985485743e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.37838066328454e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02242734449724e-1
n = 5000 , left side = 5.45433431887185e-6
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76745066372545e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83022238703923e-4
          1/n^(3/10) = 1.02256518256357e-1
```

```
          difference = 1.02073496017653e-1
n = 5000 , left side = 7.32956220088621e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76066653495645e-2
```

x

```
n = 2000 , left side = 3.46573574531495e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01909944681826e-1
n = 5000 , left side = 1.38629429813131e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75413315417603e-2
```

x^2

```
n = 2000 , left side = 3.47599488122519e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01908918768235e-1
n = 5000 , left side = 1.38793575987506e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75411673955859e-2
```

x^3

```
n = 2000 , left side = 2.61470034692679e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.01995048221665e-1
n = 5000 , left side = 1.04218354559454e-4
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.75757426170139e-2
```

x^4

```
n = 2000 , left side = 1.74827628399432e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02081690627958e-1
n = 5000 , left side = 6.95610601451069e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76103999114283e-2
```

x^{10}

```
n = 2000 , left side = 6.95028639569268e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02249567969962e-1
n = 5000 , left side = 2.73651920563241e-6
          1/n^(3/10) = 7.76799609715734e-2
```

```
                    difference = 7.76772244523678e-2


-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 3.19528048242645e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256198728309e-1
          n = 5000 , left side = 5.11242578271620e-8
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799098473156e-2
```

$$x$$

```
          n = 2000 , left side = 5.55111512312578e-17
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02256518256357e-1
          n = 5000 , left side = 0.000000000000000e0
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76799609715734e-2
```

$$x^2$$

```
          n = 2000 , left side = 9.05800419448433e-7
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02255612455938e-1
          n = 5000 , left side = 1.44928067047356e-7
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76798160435063e-2
```

$$x^3$$

```
          n = 2000 , left side = 1.35870062939469e-6
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02255159555728e-1
          n = 5000 , left side = 2.17392100737568e-7
                    1/n^(3/10) = 7.76799609715734e-2
                    difference = 7.76797435794726e-2
```

$$x^4$$

```
          n = 2000 , left side = 1.35870389414428e-6
                    1/n^(3/10) = 1.02256518256357e-1
                    difference = 1.02255159552463e-1
```

```
n = 5000 , left side = 2.17392184295728e-7
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76797435793891e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.59233443226565e-7
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02256359022914e-1
n = 5000 , left side = 2.54759104940244e-8
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76799354956629e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83159113621878e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02073359142735e-1
n = 5000 , left side = 7.32982158705431e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76066627557028e-2
```

$$x$$

```
n = 2000 , left side = 3.46421360206572e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01910096896151e-1
n = 5000 , left side = 1.38568544082562e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75413924274908e-2
```

$$x^2$$

```
n = 2000 , left side = 3.46830228773298e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01909688027584e-1
n = 5000 , left side = 1.38633963053358e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75413270085200e-2
```

$$x^3$$

```
n = 2000 , left side = 2.60429665156547e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.01996088591201e-1
n = 5000 , left side = 1.04024558415738e-4
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.75759364131576e-2
```

$$x^4$$

```
n = 2000 , left side = 1.73824667772216e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02082693588585e-1
n = 5000 , left side = 6.93824443059460e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76105785272674e-2
```

$$x^{10}$$

```
n = 2000 , left side = 6.83823608409119e-6
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02249680020273e-1
n = 5000 , left side = 2.71793687885765e-6
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76772430346945e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 9.16500819068133e-5
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02164868174451e-1
n = 5000 , left side = 3.66870091477178e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76432739624257e-2
```

$$x$$

```
n = 2000 , left side = 1.73420272625346e-4
           1/n^(3/10) = 1.02256518256357e-1
           difference = 1.02083097983732e-1
n = 5000 , left side = 6.93681090501164e-5
           1/n^(3/10) = 7.76799609715734e-2
           difference = 7.76105928625233e-2
```

$$x^2$$

```
n = 2000 , left side = 1.73739151737184e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02082779104620e-1
n = 5000 , left side = 6.94191297080926e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76105418418653e-2
```

$$x^3$$

```
n = 2000 , left side = 1.30543678276612e-4
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02125974578081e-1
n = 5000 , left side = 5.21026227034427e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76278583488699e-2
```

$$x^4$$

```
n = 2000 , left side = 8.71887656059556e-5
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02169329490751e-1
n = 5000 , left side = 3.47606053786725e-5
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76452003661947e-2
```

$$x^{10}$$

```
n = 2000 , left side = 3.44331424903836e-6
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02253074942108e-1
n = 5000 , left side = 1.36382369174317e-6
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76785971478816e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.02019013792365e-7
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02256416237344e-1
n = 5000 , left side = 1.63230216010390e-8
```

```
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76799446485518e-2
```

x

```
n = 2000 , left side = 0.000000000000000e0
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02256518256357e-1
n = 5000 , left side = 0.000000000000000e0
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76799609715734e-2
```

x^2

```
n = 2000 , left side = 2.89205348558141e-7
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02256229051009e-1
n = 5000 , left side = 4.62728558248138e-8
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76799146987176e-2
```

x^3

```
n = 2000 , left side = 4.33808022975990e-7
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02256084448334e-1
n = 5000 , left side = 6.94092836817095e-8
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76798915622897e-2
```

x^4

```
n = 2000 , left side = 4.33808315547513e-7
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02256084448042e-1
n = 5000 , left side = 6.94092910924482e-8
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76798915622823e-2
```

x^{10}

```
n = 2000 , left side = 5.08378382214642e-8
          1/n^(3/10) = 1.02256518256357e-1
          difference = 1.02256467418519e-1
n = 5000 , left side = 8.13392532625010e-9
          1/n^(3/10) = 7.76799609715734e-2
          difference = 7.76799528376481e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.31673691973467e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16290060830244e-2
n = 5000 , left side = 2.93115579032222e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38490200446987e-2
```

$$x$$

```
n = 2000 , left side = 1.38629436111959e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.09743854138783e-2
n = 5000 , left side = 5.54517744448035e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35876178792829e-2
```

$$x^2$$

```
n = 2000 , left side = 1.39158937464257e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.09690904003553e-2
n = 5000 , left side = 5.55364946611570e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.35867706771194e-2
```

$$x^3$$

```
n = 2000 , left side = 1.04767998407182e-3
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.13129997909261e-2
n = 5000 , left side = 4.17160179930071e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.37249754438009e-2
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443816e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16595565985541e-2
n = 5000 , left side = 2.78531814462968e-4
```

```
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.38636038092680e-2
```

$$x^{10}$$

```
      n = 2000 , left side = 2.80227731768255e-5
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23326570018211e-2
      n = 5000 , left side = 1.09803560959030e-5
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41311552676350e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1/4,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
      n = 2000 , left side = 3.65410972395064e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.19952688026028e-2
      n = 5000 , left side = 1.46489688196305e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.39956459355346e-2
```

$$x$$

```
      n = 2000 , left side = 6.93147180559794e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.16675325944381e-2
      n = 5000 , left side = 2.77258872223740e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.38648767515072e-2
```

$$x^2$$

```
      n = 2000 , left side = 6.97000835040928e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.16636789399570e-2
      n = 5000 , left side = 2.77875456940857e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.38642601667901e-2
```

$$x^3$$

```
      n = 2000 , left side = 5.25648214541347e-4
                1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.18350315604566e-2
n = 5000 , left side = 2.08869501477027e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.39332661222539e-2
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871171e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.20083109511267e-2
n = 5000 , left side = 1.39555255115567e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40025803686154e-2
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079194256e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23464572670785e-2
n = 5000 , left side = 5.52404203315975e-6
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41366115816978e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/4, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097031422e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23594898340276e-2
n = 5000 , left side = 1.90387245635470e-7
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41419452364853e-2
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23606797749979e-2
n = 5000 , left side = 0.000000000000000e0
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41421356237310e-2
```

$$x^2$$

```
n = 2000 , left side = 3.37320146703846e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23573065735309e-2
n = 5000 , left side = 5.39712234737255e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41415959114962e-2
```

$$x^3$$

```
n = 2000 , left side = 5.05980220055768e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23556199727973e-2
n = 5000 , left side = 8.09568352244661e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41413260553787e-2
```

$$x^4$$

```
n = 2000 , left side = 5.05984931552239e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23556199256824e-2
n = 5000 , left side = 8.09569558321566e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41413260541726e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.93100186560341e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23600866748113e-2
n = 5000 , left side = 9.48752485302982e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420407484824e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/2, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383738788e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.19944003912591e-2
n = 5000 , left side = 1.46628824907791e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39955067988232e-2
```

x

```
n = 2000 , left side = 6.93147191573318e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16675325834246e-2
n = 5000 , left side = 2.77258876629438e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38648767471015e-2
```

x^2

```
n = 2000 , left side = 6.94533444929146e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.16661463300688e-2
n = 5000 , left side = 2.77480677166264e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.38646549465647e-2
```

x^3

```
n = 2000 , left side = 5.21941990297342e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.18387377847006e-2
n = 5000 , left side = 2.08277000138785e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.39338586235922e-2
```

x^4

```
n = 2000 , left side = 3.48657415094378e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20120223599035e-2
n = 5000 , left side = 1.38962422999100e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40031732007319e-2
```

x^{10}

```
n = 2000 , left side = 1.37838066328454e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23468959683651e-2
n = 5000 , left side = 5.45433431887185e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41366812894121e-2
```

```
x0 = 1/2, Power = 1/2, lamda = 1/2,  q = 1/2
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83022238703923e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.21776575362940e-2
n = 5000 , left side = 7.32956220088621e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40688400017221e-2
```

$$x$$

```
n = 2000 , left side = 3.46573574531495e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20141062004664e-2
n = 5000 , left side = 1.38629429813131e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40035061939178e-2
```

$$x^2$$

```
n = 2000 , left side = 3.47599488122519e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20130802868754e-2
n = 5000 , left side = 1.38793575987506e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40033420477434e-2
```

$$x^3$$

```
n = 2000 , left side = 2.61470034692679e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.20992097403052e-2
n = 5000 , left side = 1.04218354559454e-4
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40379172691715e-2
```

$$x^4$$

```
n = 2000 , left side = 1.74827628399432e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.21858521465985e-2
n = 5000 , left side = 6.95610601451069e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40725745635858e-2
```

$$x^{10}$$

```
n = 2000 , left side = 6.95028639569268e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23537294886022e-2
n = 5000 , left side = 2.73651920563241e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41393991045253e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/2, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.19528048242645e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23603602469497e-2
n = 5000 , left side = 5.11242578271620e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420844994731e-2
```

$$x$$

```
n = 2000 , left side = 5.55111512312578e-17
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749978e-2
n = 5000 , left side = 0.000000000000000e0
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421356237310e-2
```

$$x^2$$

```
n = 2000 , left side = 9.05800419448433e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23597739745784e-2
n = 5000 , left side = 1.44928067047356e-7
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41419906956639e-2
```

$$x^3$$

```
n = 2000 , left side = 1.35870062939469e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23593210743685e-2
n = 5000 , left side = 2.17392100737568e-7
```

```
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41419182316302e-2
```

$$x^4$$

```
        n = 2000 , left side = 1.35870389414428e-6
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23593210711038e-2
        n = 5000 , left side = 2.17392184295728e-7
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41419182315467e-2
```

$$x^{10}$$

```
        n = 2000 , left side = 1.59233443226565e-7
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.23605205415547e-2
        n = 5000 , left side = 2.54759104940244e-8
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.41421101478205e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
        n = 2000 , left side = 1.83159113621878e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.21775206613760e-2
        n = 5000 , left side = 7.32982158705431e-5
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.40688374078604e-2
```

$$x$$

```
        n = 2000 , left side = 3.46421360206572e-4
                1/n^(1/2) = 2.23606797749979e-2
                difference = 2.20142584147913e-2
        n = 5000 , left side = 1.38568544082562e-4
                1/n^(1/2) = 1.41421356237310e-2
                difference = 1.40035670796484e-2
```

$$x^2$$

```
        n = 2000 , left side = 3.46830228773298e-4
                1/n^(1/2) = 2.23606797749979e-2
```

```
          difference = 2.20138495462246e-2
n = 5000 , left side = 1.38633963053358e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40035016606776e-2
```

$$x^3$$

```
n = 2000 , left side = 2.60429665156547e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.21002501098413e-2
n = 5000 , left side = 1.04024558415738e-4
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40381110653152e-2
```

$$x^4$$

```
n = 2000 , left side = 1.73824667772216e-4
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.21868551072257e-2
n = 5000 , left side = 6.93824443059460e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.40727531794250e-2
```

$$x^{10}$$

```
n = 2000 , left side = 6.83823608409119e-6
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.23538415389138e-2
n = 5000 , left side = 2.71793687885765e-6
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41394176868521e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 1/2, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 9.16500819068133e-5
          1/n^(1/2) = 2.23606797749979e-2
          difference = 2.22690296930911e-2
n = 5000 , left side = 3.66870091477178e-5
          1/n^(1/2) = 1.41421356237310e-2
          difference = 1.41054486145832e-2
```

$$x$$

```
n = 2000 , left side = 1.73420272625346e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.21872595023726e-2
n = 5000 , left side = 6.93681090501164e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40727675146808e-2
```

$$x^2$$

```
n = 2000 , left side = 1.73739151737184e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.21869406232607e-2
n = 5000 , left side = 6.94191297080926e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40727164940229e-2
```

$$x^3$$

```
n = 2000 , left side = 1.30543678276612e-4
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.22301360967213e-2
n = 5000 , left side = 5.21026227034427e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.40900330010275e-2
```

$$x^4$$

```
n = 2000 , left side = 8.71887656059556e-5
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.22734910093919e-2
n = 5000 , left side = 3.47606053786725e-5
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41073750183523e-2
```

$$x^{10}$$

```
n = 2000 , left side = 3.44331424903836e-6
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23572364607489e-2
n = 5000 , left side = 1.36382369174317e-6
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41407718000392e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.02019013792365e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23605777559841e-2
n = 5000 , left side = 1.63230216010390e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421193007093e-2
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606797749979e-2
n = 5000 , left side = 0.000000000000000e0
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421356237310e-2
```

$$x^2$$

```
n = 2000 , left side = 2.89205348558141e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23603905696493e-2
n = 5000 , left side = 4.62728558248138e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420893508751e-2
```

$$x^3$$

```
n = 2000 , left side = 4.33808022975990e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23602459669749e-2
n = 5000 , left side = 6.94092836817095e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420662144473e-2
```

$$x^4$$

```
n = 2000 , left side = 4.33808315547513e-7
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23602459666823e-2
n = 5000 , left side = 6.94092910924482e-8
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41420662144399e-2
```

$$x^{10}$$

```
n = 2000 , left side = 5.08378382214642e-8
           1/n^(1/2) = 2.23606797749979e-2
           difference = 2.23606289371597e-2
n = 5000 , left side = 8.13392532625010e-9
           1/n^(1/2) = 1.41421356237310e-2
           difference = 1.41421274898056e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 7.31673691973467e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.15799015074118e-3
n = 5000 , left side = 2.93115579032222e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.28155100805823e-3
```

$$x$$

```
n = 2000 , left side = 1.38629436111959e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.50336948159506e-3
n = 5000 , left side = 5.54517744448035e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.02014884264241e-3
```

$$x^2$$

```
n = 2000 , left side = 1.39158937464257e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.49807446807208e-3
n = 5000 , left side = 5.55364946611570e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.01930164047888e-3
```

$$x^3$$

```
n = 2000 , left side = 1.04767998407182e-3
           1/n^(7/10) = 4.88966384271464e-3
           difference = 3.84198385864282e-3
n = 5000 , left side = 4.17160179930071e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.15750640716038e-3
```

$$x^4$$

```
n = 2000 , left side = 7.01123176443816e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.18854066627083e-3
n = 5000 , left side = 2.78531814462968e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29613477262748e-3
```

$$x^{10}$$

```
n = 2000 , left side = 2.80227731768255e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.86164106953782e-3
n = 5000 , left side = 1.09803560959030e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.56368623099455e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.65410972395064e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.52425287031958e-3
n = 5000 , left side = 1.46489688196305e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.42817689889414e-3
```

$$x$$

```
n = 2000 , left side = 6.93147180559794e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.19651666215485e-3
n = 5000 , left side = 2.77258872223740e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29740771486671e-3
```

$$x^2$$

```
n = 2000 , left side = 6.97000835040928e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.19266300767372e-3
n = 5000 , left side = 2.77875456940857e-4
```

```
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.29679113014959e-3
```

$$x^3$$

```
n = 2000 , left side = 5.25648214541347e-4
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.36401562817330e-3
n = 5000 , left side = 2.08869501477027e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.36579708561342e-3
```

$$x^4$$

```
n = 2000 , left side = 3.52368823871171e-4
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.53729501884347e-3
n = 5000 , left side = 1.39555255115567e-4
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.43511133197488e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.42225079194256e-5
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.87544133479522e-3
n = 5000 , left side = 5.52404203315975e-6
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.56914254505729e-3
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/4,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.18994097031422e-6
                1/n^(7/10) = 4.88966384271464e-3
                difference = 4.88847390174433e-3
n = 5000 , left side = 1.90387245635470e-7
                1/n^(7/10) = 2.57466658709045e-3
                difference = 2.57447619984481e-3
```

$$x$$

```
n = 2000 , left side = 0.000000000000000e0
                1/n^(7/10) = 4.88966384271464e-3
```

```
          difference = 4.88966384271464e-3
n = 5000 , left side = 0.000000000000000e0
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57466658709045e-3
```

$$x^2$$

```
n = 2000 , left side = 3.37320146703846e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88629064124761e-3
n = 5000 , left side = 5.39712234737255e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57412687485571e-3
```

$$x^3$$

```
n = 2000 , left side = 5.05980220055768e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88460404051409e-3
n = 5000 , left side = 8.09568352244661e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57385701873820e-3
```

$$x^4$$

```
n = 2000 , left side = 5.05984931552239e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88460399339912e-3
n = 5000 , left side = 8.09569558321566e-7
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57385701753213e-3
```

$$x^{10}$$

```
n = 2000 , left side = 5.93100186560341e-7
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88907074252808e-3
n = 5000 , left side = 9.48752485302982e-8
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57457171184192e-3
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.66279383738788e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.52338445897586e-3
n = 5000 , left side = 1.46628824907791e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.42803776218266e-3
```

x

```
n = 2000 , left side = 6.93147191573318e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.19651665114133e-3
n = 5000 , left side = 2.77258876629438e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29740771046101e-3
```

x^2

```
n = 2000 , left side = 6.94533444929146e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.19513039778550e-3
n = 5000 , left side = 2.77480677166264e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.29718590992418e-3
```

x^3

```
n = 2000 , left side = 5.21941990297342e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.36772185241730e-3
n = 5000 , left side = 2.08277000138785e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.36638958695166e-3
```

x^4

```
n = 2000 , left side = 3.48657415094378e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54100642762027e-3
n = 5000 , left side = 1.38962422999100e-4
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.43570416409135e-3
```

x^{10}

```
n = 2000 , left side = 1.37838066328454e-5
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.87588003608180e-3
```

```
          n = 5000 , left side = 5.45433431887185e-6
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.56921225277158e-3


-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1/2,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 1.83022238703923e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.70664160401072e-3
          n = 5000 , left side = 7.32956220088621e-5
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.50137096508159e-3
```

$$x$$

```
          n = 2000 , left side = 3.46573574531495e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.54309026818315e-3
          n = 5000 , left side = 1.38629429813131e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.43603715727732e-3
```

$$x^2$$

```
          n = 2000 , left side = 3.47599488122519e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.54206435459213e-3
          n = 5000 , left side = 1.38793575987506e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.43587301110294e-3
```

$$x^3$$

```
          n = 2000 , left side = 2.61470034692679e-4
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.62819380802197e-3
          n = 5000 , left side = 1.04218354559454e-4
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.47044823253099e-3
```

$$x^4$$

```
n = 2000 , left side = 1.74827628399432e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.71483621431521e-3
n = 5000 , left side = 6.95610601451069e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.50510552694534e-3
```

$$x^{10}$$

```
n = 2000 , left side = 6.95028639569268e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88271355631895e-3
n = 5000 , left side = 2.73651920563241e-6
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57193006788482e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1/2, q = 1

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 3.19528048242645e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88934431466640e-3
n = 5000 , left side = 5.11242578271620e-8
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57461546283262e-3
```

$$x$$

```
n = 2000 , left side = 5.55111512312578e-17
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88966384271459e-3
n = 5000 , left side = 0.000000000000000e0
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57466658709045e-3
```

$$x^2$$

```
n = 2000 , left side = 9.05800419448433e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88875804229520e-3
n = 5000 , left side = 1.44928067047356e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57452165902340e-3
```

$$x^3$$

```
n = 2000 , left side = 1.35870062939469e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88830514208525e-3
n = 5000 , left side = 2.17392100737568e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57444919498971e-3
```

$$x^4$$

```
n = 2000 , left side = 1.35870389414428e-6
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88830513882050e-3
n = 5000 , left side = 2.17392184295728e-7
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57444919490615e-3
```

$$x^{10}$$

```
n = 2000 , left side = 1.59233443226565e-7
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.88950460927142e-3
n = 5000 , left side = 2.54759104940244e-8
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.57464111117995e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 1.83159113621878e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.70650472909277e-3
n = 5000 , left side = 7.32982158705431e-5
           1/n^(7/10) = 2.57466658709045e-3
           difference = 2.50136837121991e-3
```

$$x$$

```
n = 2000 , left side = 3.46421360206572e-4
           1/n^(7/10) = 4.88966384271464e-3
           difference = 4.54324248250807e-3
n = 5000 , left side = 1.38568544082562e-4
```

```
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.43609804300789e-3
```

$$x^2$$

```
n = 2000 , left side = 3.46830228773298e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.54283361394135e-3
n = 5000 , left side = 1.38633963053358e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.43603262403709e-3
```

$$x^3$$

```
n = 2000 , left side = 2.60429665156547e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.62923417755810e-3
n = 5000 , left side = 1.04024558415738e-4
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.47064202867471e-3
```

$$x^4$$

```
n = 2000 , left side = 1.73824667772216e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.71583917494243e-3
n = 5000 , left side = 6.93824443059460e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.50528414278450e-3
```

$$x^{10}$$

```
n = 2000 , left side = 6.83823608409119e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88282560663055e-3
n = 5000 , left side = 2.71793687885765e-6
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57194865021159e-3
```

---

x0 = 1/2, Power = 7/10, lamda = 1, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 2000 , left side = 9.16500819068133e-5
          1/n^(7/10) = 4.88966384271464e-3
```

```
          difference = 4.79801376080783e-3
n = 5000 , left side = 3.66870091477178e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.53797957794273e-3
```

x

```
n = 2000 , left side = 1.73420272625346e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.71624357008930e-3
n = 5000 , left side = 6.93681090501164e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.50529847804033e-3
```

x^2

```
n = 2000 , left side = 1.73739151737184e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.71592469097746e-3
n = 5000 , left side = 6.94191297080926e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.50524745738236e-3
```

x^3

```
n = 2000 , left side = 1.30543678276612e-4
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.75912016443803e-3
n = 5000 , left side = 5.21026227034427e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.52256396438701e-3
```

x^4

```
n = 2000 , left side = 8.71887656059556e-5
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.80247507710869e-3
n = 5000 , left side = 3.47606053786725e-5
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.53990598171178e-3
```

x^{10}

```
n = 2000 , left side = 3.44331424903836e-6
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88622052846561e-3
n = 5000 , left side = 1.36382369174317e-6
          1/n^(7/10) = 2.57466658709045e-3
```

```
                    difference = 2.57330276339871e-3


-------------------------------------------------------------------------------
x0 = 1/2, Power = 7/10, lamda = 1,  q = 1
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 2000 , left side = 1.02019013792365e-7
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.88956182370085e-3
          n = 5000 , left side = 1.63230216010390e-8
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57465026406885e-3
```

$$x$$

```
          n = 2000 , left side = 0.000000000000000e0
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.88966384271464e-3
          n = 5000 , left side = 0.000000000000000e0
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57466658709045e-3
```

$$x^2$$

```
          n = 2000 , left side = 2.89205348558141e-7
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.88937463736609e-3
          n = 5000 , left side = 4.62728558248138e-8
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57462031423462e-3
```

$$x^3$$

```
          n = 2000 , left side = 4.33808022975990e-7
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.88923003469167e-3
          n = 5000 , left side = 6.94092836817095e-8
                    1/n^(7/10) = 2.57466658709045e-3
                    difference = 2.57459717780677e-3
```

$$x^4$$

```
          n = 2000 , left side = 4.33808315547513e-7
                    1/n^(7/10) = 4.88966384271464e-3
                    difference = 4.88923003439910e-3
```

```
n = 5000 , left side = 6.94092910924482e-8
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57459717779936e-3
```

$$x^{10}$$

```
n = 2000 , left side = 5.08378382214642e-8
          1/n^(7/10) = 4.88966384271464e-3
          difference = 4.88961300487642e-3
n = 5000 , left side = 8.13392532625010e-9
          1/n^(7/10) = 2.57466658709045e-3
          difference = 2.57465845316512e-3
```

13 Real-valued neural network approximation based on the q-deformed and λ-parametrized Hyperbolic Tangent - part 3

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [sin(x), cos(x)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for power in powers:      #going over various powers for 1/n^power
        ##########################################################
        for lamda in lamdas:  #going over each lamda value
        ##########################################################
            for q in qs:      #going over each q value
            ##########################################################
                print()
                print()
               ␣
↪print("-------------------------------------------------------------------------------")
                print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
               ␣
↪print("-------------------------------------------------------------------------------")

                #the activation function
                phi(x) =  (e^(lamda*x)-q*e^(-lamda*x))/
↪(e^(lamda*x)+q*e^(-lamda*x))   #formula  18.1

                #
                G(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 18.9

                ##########################################################
                for i in range(len(funcs)):
                ##########################################################
                    f(x)=funcs[i]
                    show(f(x))
                    for n in [10000, 20000]:
```

```
                        #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                        #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
                        #leftSide = abs(L(n,f,x0)-f(x0))
                        leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),.
↪.,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                        val1 = n
                        val2 = leftSide.n()
                        val3 = 1/(n^power).n()
                        print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                 difference = "+str(val3-val2))
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/4
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10000 , left side = 1.95976730160918e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.28997577178584e-2
          n = 20000 , left side = 9.80070916810627e-5
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11516544135793e-2
```

$$\cos(x)$$

```
          n = 10000 , left side = 1.96126495751847e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.28996079522675e-2
          n = 20000 , left side = 9.80445330771573e-5
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11516169721832e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/4*pi, Power = 3/10, lamda = 1/4,  q = 1/2
-------------------------------------------------------------------------------
```

$$\sin(x)$$

```
          n = 10000 , left side = 9.79713085184075e-5
                    1/n^(3/10) = 6.30957344480193e-2
```

```
difference = 6.29977631395009e-2
```

[ ]:
```
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
↪the beta values in the formula
qs = [1/4, 1/2, 1]  #deformation coefficient

funcs = [x^(1/3), x, x^2, x^3, x^4, x^10]  #choice of functions
a = -1   #the interval
b = 1    #the interval
x0=1/2


for power in powers:
    ##########################################################
    for lamda in lamdas:  #going over each lamda value
    ##########################################################
        for q in qs:      #going over each q value
        ############################################################
            print()
            print()
           ␣
↪print("-------------------------------------------------------------------------------")
            print("x0 = " + str(x0)+", Power = "+ str(power)+ ", lamda = "+␣
↪str(lamda) + ",  q = " + str(q))
           ␣
↪print("-------------------------------------------------------------------------------")


            #the activation function
            phi(x) =  (e^(lamda*x)-q*e^(-lamda*x))/(e^(lamda*x)+q*e^(-lamda*x)) ␣
↪ #formula  18.1

            #
            G(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 18.9

            ##########################################################
            for i in range(len(funcs)):
            ##########################################################
                f(x)=funcs[i]
                show(f(x))
                for n in [10000, 20000]:
                    #def L(n, f, x):    #real-valued linear neural network␣
↪operators
                    #    return sum(f(k/n)*G(n*x-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x-k) for k in [ceil(n*a),..,floor(n*b)])
```

```
                    #leftSide = abs(L(n,f,x0)-f(x0))
                    leftSide = abs(sum(f(k/n)*G(n*x0-k) for k in [ceil(n*a),..
↪,floor(n*b)])/sum(G(n*x0-k) for k in [ceil(n*a),..,floor(n*b)])-f(x0))
                    val1 = n
                    val2 = leftSide.n()
                    val3 = 1/(n^power).n()
                    print("          n = "+str(val1), ", left side =␣
↪"+str(val2),  "\n                    1/n^("+str(power)+") = "+str(val3), "\n  ␣
↪                  difference = "+str(val3-val2))
```

```
--------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/4,  q = 1/4
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 1.46632346878395e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.29491021011409e-2
          n = 20000 , left side = 7.33348323127547e-5
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11763266729476e-2
```

$$x$$

```
          n = 10000 , left side = 2.77258872223962e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.28184755757954e-2
          n = 20000 , left side = 1.38629436111981e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11110320691484e-2
```

$$x^2$$

```
          n = 10000 , left side = 2.77470672764790e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.28182637752545e-2
          n = 20000 , left side = 1.38682386247202e-4
                    1/n^(3/10) = 5.12496615052604e-2
                    difference = 5.11109791190132e-2
```

$$x^3$$

```
          n = 10000 , left side = 2.08261988522945e-4
                    1/n^(3/10) = 6.30957344480193e-2
                    difference = 6.28874724594964e-2
```

```
n = 20000 , left side = 1.04051518979742e-4
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11456099862806e-2
```

$$x^4$$

```
n = 10000 , left side = 1.38947404154099e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29567870438652e-2
n = 20000 , left side = 6.93941766531508e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11802673286072e-2
```

$$x^{10}$$

```
n = 10000 , left side = 5.45256858194539e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30902818794374e-2
n = 20000 , left side = 2.71692949521066e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12469445757652e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/4, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.32991512724102e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30224352967469e-2
n = 20000 , left side = 3.66631610100310e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12129983442503e-2
```

$$x$$

```
n = 10000 , left side = 1.38629436112869e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29571050119065e-2
n = 20000 , left side = 6.93147180559350e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803467872044e-2
```

$$x^2$$

```
n = 10000 , left side = 1.38783582291413e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29569508657279e-2
n = 20000 , left side = 6.93532546008901e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803082506595e-2
```

$$x^3$$

```
n = 10000 , left side = 1.04203355131977e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29915310928874e-2
n = 20000 , left side = 5.20438507066179e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11976176545538e-2
```

$$x^4$$

```
n = 10000 , left side = 6.95460549745980e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30261883930447e-2
n = 20000 , left side = 3.47151785462102e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149463267142e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.73475758799874e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30929996904313e-2
n = 20000 , left side = 1.36058399549210e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12483009212649e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/4, q = 1

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 4.75966933644045e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956868513260e-2
n = 20000 , left side = 1.18991648756506e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496496060955e-2
```

$$x$$

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957344480193e-2
n = 20000 , left side = 0.000000000000000e0
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496615052604e-2
```

$$x^2$$

```
n = 10000 , left side = 1.34928058670436e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955995199607e-2
n = 20000 , left side = 3.37320146259756e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496277732458e-2
```

$$x^3$$

```
n = 10000 , left side = 2.02392088061165e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955320559313e-2
n = 20000 , left side = 5.05980219667190e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496109072384e-2
```

$$x^4$$

```
n = 10000 , left side = 2.02392163403675e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30955320558559e-2
n = 20000 , left side = 5.05980266712891e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496109072337e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.37180713688959e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957107299480e-2
n = 20000 , left side = 5.92947202253911e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496555757884e-2
```

```
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1/4
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 7.33339519934928e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30224004960258e-2
n = 20000 , left side = 3.66718634812191e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12129896417792e-2
```

$$x$$

```
n = 10000 , left side = 1.38629438314442e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29571050097049e-2
n = 20000 , left side = 6.93147191572763e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803467861031e-2
```

$$x^2$$

```
n = 10000 , left side = 1.38684888448870e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29570495595705e-2
n = 20000 , left side = 6.93285816908418e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11803329235695e-2
```

$$x^3$$

```
n = 10000 , left side = 1.04055271670012e-4
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.29916791763493e-2
n = 20000 , left side = 5.20068353849767e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.11976546698754e-2
```

$$x^4$$

```
n = 10000 , left side = 6.93979298337505e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30263365181856e-2
n = 20000 , left side = 3.46781578120514e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149833474483e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.71736996781133e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30930170780515e-2
n = 20000 , left side = 1.35624196163052e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12483052632987e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1/2, q = 1/2

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 3.66622776546421e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30590721703647e-2
n = 20000 , left side = 1.83347566427017e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12313267486177e-2
```

$$x$$

```
n = 10000 , left side = 6.93147149063433e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30264197331130e-2
n = 20000 , left side = 3.46573574532272e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12150041478071e-2
```

$$x^2$$

```
n = 10000 , left side = 6.93557514500065e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30263786965693e-2
n = 20000 , left side = 3.46676165891013e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12149938886713e-2
```

$$x^3$$

```
n = 10000 , left side = 5.20475988625424e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30436868491568e-2
n = 20000 , left side = 2.60084077771394e-5
```

```
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12236530974832e-2
```

$$x^4$$

```
          n = 10000 , left side = 3.47189280094640e-5
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30610155200099e-2
          n = 20000 , left side = 1.73440694011678e-5
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12323174358592e-2
```

$$x^{10}$$

```
          n = 10000 , left side = 1.36102387619818e-6
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30943734241431e-2
          n = 20000 , left side = 6.78705799766121e-7
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12489827994606e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1/2,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
          n = 10000 , left side = 1.27810567684961e-8
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30957216669626e-2
          n = 20000 , left side = 3.19526349823462e-9
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496583099969e-2
```

$$x$$

```
          n = 10000 , left side = 0.000000000000000e0
                1/n^(3/10) = 6.30957344480193e-2
                difference = 6.30957344480193e-2
          n = 20000 , left side = 0.000000000000000e0
                1/n^(3/10) = 5.12496615052604e-2
                difference = 5.12496615052604e-2
```

$$x^2$$

```
          n = 10000 , left side = 3.62320168312280e-8
                1/n^(3/10) = 6.30957344480193e-2
```

```
          difference = 6.30956982160025e-2
n = 20000 , left side = 9.05800418005143e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496524472562e-2
```

$$x^3$$

```
n = 10000 , left side = 5.43480251358197e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956800999942e-2
n = 20000 , left side = 1.35870062423216e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496479182541e-2
```

$$x^4$$

```
n = 10000 , left side = 5.43480303677457e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30956800999890e-2
n = 20000 , left side = 1.35870062700771e-8
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496479182541e-2
```

$$x^{10}$$

```
n = 10000 , left side = 6.36892661591386e-9
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957280790927e-2
n = 20000 , left side = 1.59222780251288e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496599130326e-2
```

---

x0 = 1/2, Power = 3/10, lamda = 1, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 3.66548739493266e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30590795740700e-2
n = 20000 , left side = 1.83288788805358e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12313326263798e-2
```

$$x$$

```
n = 10000 , left side = 6.92842720413367e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30264501759780e-2
n = 20000 , left side = 3.46421360207794e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12150193692396e-2
```

$$x^2$$

```
n = 10000 , left side = 6.93006267839524e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30264338212354e-2
n = 20000 , left side = 3.46462247063362e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12150152805540e-2
```

$$x^3$$

```
n = 10000 , left side = 5.19877388821810e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30437467091371e-2
n = 20000 , left side = 2.59877353861737e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12236737698742e-2
```

$$x^4$$

```
n = 10000 , left side = 3.46666736098927e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30610677744094e-2
n = 20000 , left side = 1.73272017113674e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12323343035490e-2
```

$$x^{10}$$

```
n = 10000 , left side = 1.35608586396773e-6
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30943783621554e-2
n = 20000 , left side = 6.77323254739525e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12489841820056e-2
```

```
-------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1/2
-------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.83480025741645e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30773864454452e-2
n = 20000 , left side = 9.17512596976255e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12404863792906e-2
```

$$x$$

```
n = 10000 , left side = 3.46840545251137e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30610503934942e-2
n = 20000 , left side = 1.73420272625568e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12323194779978e-2
```

$$x^2$$

```
n = 10000 , left side = 3.46968096895939e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30610376383297e-2
n = 20000 , left side = 1.73452160537879e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12323162892066e-2
```

$$x^3$$

```
n = 10000 , left side = 2.60321748816461e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30697022731377e-2
n = 20000 , left side = 1.30113037888624e-5
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12366502014715e-2
```

$$x^4$$

```
n = 10000 , left side = 1.73611624921383e-5
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30783732855272e-2
n = 20000 , left side = 8.67579712438005e-6
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12409857081360e-2
```

$$x^{10}$$

```
n = 10000 , left side = 6.79666223719162e-7
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30950547817956e-2
n = 20000 , left side = 3.39272144287165e-7
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12493222331161e-2


--------------------------------------------------------------------------------
x0 = 1/2, Power = 3/10, lamda = 1,  q = 1
--------------------------------------------------------------------------------
```

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 4.08075506719285e-9
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957303672643e-2
n = 20000 , left side = 1.02018837822016e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496604850720e-2
```

$$x$$

```
n = 10000 , left side = 0.000000000000000e0
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957344480193e-2
n = 20000 , left side = 0.000000000000000e0
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496615052604e-2
```

$$x^2$$

```
n = 10000 , left side = 1.15682139423257e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957228798054e-2
n = 20000 , left side = 2.89205359660372e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496586132068e-2
```

$$x^3$$

```
n = 10000 , left side = 1.73523209134885e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957170956984e-2
n = 20000 , left side = 4.33808025612770e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496571671801e-2
```

$$x^4$$

```
n = 10000 , left side = 1.73523213436999e-8
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957170956980e-2
n = 20000 , left side = 4.33808787503320e-9
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496571671725e-2
```

$$x^{10}$$

```
n = 10000 , left side = 2.03347633935362e-9
          1/n^(3/10) = 6.30957344480193e-2
          difference = 6.30957324145430e-2
n = 20000 , left side = 5.08369847954104e-10
          1/n^(3/10) = 5.12496615052604e-2
          difference = 5.12496609968905e-2
```

---

x0 = 1/2, Power = 1/2, lamda = 1/4, q = 1/4

$$x^{\frac{1}{3}}$$

```
n = 10000 , left side = 1.46632346878395e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.85336765312161e-3
n = 20000 , left side = 7.33348323127547e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.99773297955272e-3
```

$$x$$

```
n = 10000 , left side = 2.77258872223962e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72274112777604e-3
n = 20000 , left side = 1.38629436111981e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93243837575349e-3
```

$$x^2$$

```
n = 10000 , left side = 2.77470672764790e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.72252932723521e-3
n = 20000 , left side = 1.38682386247202e-4
```

```
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.93238542561827e-3
```

$$x^3$$

```
n = 10000 , left side = 2.08261988522945e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.79173801147705e-3
n = 20000 , left side = 1.04051518979742e-4
          1/n^(1/2) = 7.07106781186548e-3
          difference = 6.96701629288573e-3
```

$$x^4$$

```
n = 10000 , left side = 1.38947404154099e-4
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.86105259584590e-3
n = 20000 , left side = 6.93941766531508e-5
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.00167363521232e-3
```

$$x^{10}$$

```
n = 10000 , left side = 5.45256858194539e-6
          1/n^(1/2) = 1.00000000000000e-2
          difference = 9.99454743141806e-3
n = 20000 , left side = 2.71692949521066e-6
          1/n^(1/2) = 7.07106781186548e-3
          difference = 7.06835088237026e-3
```

14 Real-valued neural network approximation based on the q-deformed and λ-parametrized Hyperbolic Tangent - in the C# programming language

We have tested some of the results given above using C# (instead of SageMath).

It is important to note that these results have a limited accuracy. In general, "Double precision numbers are accurate up to sixteen decimal places but after calculations have been done there may be some rounding errors to account for." [4]

We also created versions of our code that works with Decimal numbers - which allows computations with more significant decimal places.

In some cases we got the same results as seen in the sections above where we used SageMath, while in others, we got NaN (Not a number) or even "Unhandled exception. System.OverflowException: Value was either too large or too small for a Decimal."

Please note that, as with the previous chapters, we removed several of the results generated by the code below.

[ ]:
```
using System;
using System.Diagnostics;

StreamWriter outFile = new StreamWriter("Results.txt'');

double[] powers = { 3.0 / 10, 1.0 / 2, 7.0 / 10 };
double[] lamdas = { 1.0 / 4, 1.0 / 2, 1 };
double[] qs = { 1.0 / 4, 1.0 /2, 1 }; //deformation coefficient


//funcs = [x^(1/3), x] #choice of functions
List <Func < double, double > > funcs = new(); List funcNames = new();

funcNames.Add("x"); funcs.Add((x) => x); //for only a single statement
funcNames.Add("x^2"); funcs.Add((x)=> x * x); //for only a single statement
funcNames.Add("x^3"); funcs.Add((x) => x * x * x); //for only a single statement
funcNames.Add("x^4"); funcs.Add((x)=> x * x * x * x); //for only a single␣
 ↪statement
funcNames.Add("x^10"); funcs.Add((x) => Math.Pow(x, 10)); //for only a single␣
 ↪statement

double a = -1;// #the interval
double b = 1; // #the interval
double x0 = 1.0 / 2;

foreach (var power in powers) {
   foreach (var lamda in lamdas) {
      foreach (var q in qs) {
```

```
        outFile.WriteLine(); outFile.WriteLine();
        outFile.
↪WriteLine("-------------------------------------------------------");
        outFile.WriteLine($"x0 = {x0}, Power = {power} , lamda = {lamda} , q =␣
↪{q}");
        outFile.
↪WriteLine("-------------------------------------------------------");

        //the activation function
        Func<double, double, double, double> phi = (lamda, q, x) =>
        {
            return (Math.Pow(Math.E, (lamda * x)) - q * Math.Pow(Math.E,␣
↪(-lamda * x)))
                / (Math.Pow(Math.E, (lamda * x)) + q * Math.Pow(Math.E, (-lamda␣
↪* x))); //  #formula  18.1
        };


        Func<double, double, double, double> G = (lamda, q, x) =>
        {
            return 1.0 / 4 * (phi(lamda, q, x + 1) - phi(lamda, q, x - 1));    /
↪/#formula 18.91
        };


        int indexF = -1;
        //#############################################################
        foreach (var f in funcs)
        //#############################################################
        {

           indexF++;

           //show(f(x))
           outFile.WriteLine($"{funcNames[indexF]}");
           foreach (var n in new int[] { 10, 20, 50, 100, 200, 500, 1000, 2000,␣
↪5000, 10_000 })  //, 50_000, 100_000
           {
               Func<double, Func<double, double>, double, double> L = (n, f, x)␣
↪=> //#real-valued linear neural network operators
               {
                       double totalNumer = 0;
                       double totalDenom = 0;
                       for (double k = Math.Ceiling(n * a); k <= Math.Floor(n *␣
↪b); k++)
                       {
```

```
                            totalNumer += f(k / n) * G(lamda, q, n * x - k);
                            totalDenom += G(lamda, q, n * x - k);
                        }
                        return totalNumer / totalDenom;
                };
                double computedL = L(n, f, x0);
                double computedf = f(x0);

                var leftSide = Math.Abs(computedL - computedf);
                outFile.WriteLine($" --------> L(n, f, x0) = {computedL}");
                outFile.WriteLine($" --------> f(x0) = {computedf}");
                outFile.WriteLine($" --------> leftSide = {leftSide}");
                var val1 = n;
                var val2 = leftSide;
                var val3 = 1 / (Math.Pow(n, power));
                outFile.WriteLine($"          n = {val1}, left side = {val2:
 ↪F15},  1 / n ^ {power:F4} = {val3:F15}");
                outFile.WriteLine($"          difference = {val3 - val2:F15} ");
            }
        }
      }
   }
}
outFile.Close();
```

Here are some of the results obtained using the code above:

```
-------------------------------------------------------------------------------
x0 = 0.5, Power = 0.3 , lamda = 0.25 , q = 0.25
-------------------------------------------------------------------------------

x
--------> L(n, f, x0) = 0.6469605415088784
--------> f(x0) = 0.5
--------> leftSide = 0.14696054150887838
      n = 10, left side = 0.146960541508878,  1 / n^0.3000 = 0.501187233627272
      difference = 0.354226692118394


--------> L(n, f, x0) = 0.6280448189448932
--------> f(x0) = 0.5
--------> leftSide = 0.12804481894489317
      n = 20, left side = 0.128044818944893,  1 / n^0.3000 = 0.407090531536904
      difference = 0.279045712592011


--------> L(n, f, x0) = 0.5554458428059437
```

```
--------> f(x0) = 0.5
--------> leftSide = 0.05544584280594367
      n = 50, left side = 0.055445842805944,  1 / n^0.3000 = 0.309249494710992
      difference = 0.253803651905048


--------> L(n, f, x0) = 0.5277258872001901
--------> f(x0) = 0.5
--------> leftSide = 0.02772588720019009
      n = 100, left side = 0.027725887200190,  1 / n^0.3000 = 0.251188643150958
      difference = 0.223462755950768


--------> L(n, f, x0) = 0.513862943611199
--------> f(x0) = 0.5
--------> leftSide = 0.013862943611198997
      n = 200, left side = 0.013862943611199,  1 / n^0.3000 = 0.204028577336837
      difference = 0.190165633725638


--------> L(n, f, x0) = 0.5055451774444791
--------> f(x0) = 0.5
--------> leftSide = 0.005545177444479132
      n = 500, left side = 0.005545177444479,  1 / n^0.3000 = 0.154991898754834
      difference = 0.149446721310355


--------> L(n, f, x0) = 0.5027725887222397
--------> f(x0) = 0.5
--------> leftSide = 0.0027725887222397327
      n = 1000, left side = 0.002772588722240,  1 / n^0.3000 = 0.125892541179417
      difference = 0.123119952457177


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.5
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.5
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN
```

```
--------> L(n, f, x0) = NaN
--------> f(x0) = 0.5
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


x^2
--------> L(n, f, x0) = 0.49406895721509386
--------> f(x0) = 0.25
--------> leftSide = 0.24406895721509386
      n = 10, left side = 0.244068957215094,  1 / n^0.3000 = 0.501187233627272
      difference = 0.257118276412178


--------> L(n, f, x0) = 0.42339349636223705
--------> f(x0) = 0.25
--------> leftSide = 0.17339349636223705
      n = 20, left side = 0.173393496362237,  1 / n^0.3000 = 0.407090531536904
      difference = 0.233697035174667


--------> L(n, f, x0) = 0.31391431405764025
--------> f(x0) = 0.25
--------> leftSide = 0.06391431405764025
      n = 50, left side = 0.063914314057640,  1 / n^0.3000 = 0.309249494710992
      difference = 0.245335180653351


--------> L(n, f, x0) = 0.2798438925970292
--------> f(x0) = 0.25
--------> leftSide = 0.029843892597029187
      n = 100, left side = 0.029843892597029,  1 / n^0.3000 = 0.251188643150958
      difference = 0.221344750553929


--------> L(n, f, x0) = 0.26439244496346914
--------> f(x0) = 0.25
--------> leftSide = 0.014392444963469142
      n = 200, left side = 0.014392444963469,  1 / n^0.3000 = 0.204028577336837
      difference = 0.189636132373368


--------> L(n, f, x0) = 0.25562989766084293
--------> f(x0) = 0.25
--------> leftSide = 0.005629897660842931
      n = 500, left side = 0.005629897660843,  1 / n^0.3000 = 0.154991898754834
      difference = 0.149362001093991
```

```
--------> L(n, f, x0) = 0.2527937687763307
--------> f(x0) = 0.25
--------> leftSide = 0.002793768776330696
      n = 1000, left side = 0.002793768776331,  1 / n^0.3000 = 0.125892541179417
      difference = 0.123098772403086


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.25
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.25
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.25
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


x^3
--------> L(n, f, x0) = 0.39553208148695584
--------> f(x0) = 0.125
--------> leftSide = 0.27053208148695584
      n = 10, left side = 0.270532081486956,  1 / n^0.3000 = 0.501187233627272
      difference = 0.230655152140317


--------> L(n, f, x0) = 0.3003038582607329
--------> f(x0) = 0.125
--------> leftSide = 0.17530385826073291
      n = 20, left side = 0.175303858260733,  1 / n^0.3000 = 0.407090531536904
      difference = 0.231786673276172


--------> L(n, f, x0) = 0.18035341668819518
--------> f(x0) = 0.125
--------> leftSide = 0.055353416688195184
```

```
      n = 50, left side = 0.055353416688195,  1 / n^0.3000 = 0.309249494710992
      difference = 0.253896078022797


--------> L(n, f, x0) = 0.14910496707077794
--------> f(x0) = 0.125
--------> leftSide = 0.024104967070777944
      n = 100, left side = 0.024104967070778,  1 / n^0.3000 = 0.251188643150958
      difference = 0.227083676080180


--------> L(n, f, x0) = 0.13620815268453845
--------> f(x0) = 0.125
--------> leftSide = 0.011208152684538453
      n = 200, left side = 0.011208152684538,  1 / n^0.3000 = 0.204028577336837
      difference = 0.192820424652299


--------> L(n, f, x0) = 0.1292870317565595
--------> f(x0) = 0.125
--------> leftSide = 0.004287031756559506
      n = 500, left side = 0.004287031756560,  1 / n^0.3000 = 0.154991898754834
      difference = 0.150704866998274


--------> L(n, f, x0) = 0.12711134516639788
--------> f(x0) = 0.125
--------> leftSide = 0.002111345166397882
      n = 1000, left side = 0.002111345166398,  1 / n^0.3000 = 0.125892541179417
      difference = 0.123781196013019


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.125
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.125
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.125
```

```
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


x^4
--------> L(n, f, x0) = 0.33431165532114465
--------> f(x0) = 0.0625
--------> leftSide = 0.27181165532114465
      n = 10, left side = 0.271811655321145,  1 / n^0.3000 = 0.501187233627272
      difference = 0.229375578306128


--------> L(n, f, x0) = 0.22220078089792553
--------> f(x0) = 0.0625
--------> leftSide = 0.15970078089792553
      n = 20, left side = 0.159700780897926,  1 / n^0.3000 = 0.407090531536904
      difference = 0.247389750638979


--------> L(n, f, x0) = 0.10528678938945549
--------> f(x0) = 0.0625
--------> leftSide = 0.04278678938945549
      n = 50, left side = 0.042786789389455,  1 / n^0.3000 = 0.309249494710992
      difference = 0.266462705321536


--------> L(n, f, x0) = 0.07982139153498581
--------> f(x0) = 0.0625
--------> leftSide = 0.01732139153498581
      n = 100, left side = 0.017321391534986,  1 / n^0.3000 = 0.251188643150958
      difference = 0.233867251615972


--------> L(n, f, x0) = 0.07026000677274202
--------> f(x0) = 0.0625
--------> leftSide = 0.007760006772742023
      n = 200, left side = 0.007760006772742,  1 / n^0.3000 = 0.204028577336837
      difference = 0.196268570564095


--------> L(n, f, x0) = 0.06540182870840235
--------> f(x0) = 0.0625
--------> leftSide = 0.002901828708402346
      n = 500, left side = 0.002901828708402,  1 / n^0.3000 = 0.154991898754834
      difference = 0.152090070046431
```

```
--------> L(n, f, x0) = 0.06391833296468906
--------> f(x0) = 0.0625
--------> leftSide = 0.0014183329646890591
      n = 1000, left side = 0.001418332964689,  1 / n^0.3000 = 0.125892541179417
      difference = 0.124474208214728


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0625
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0625
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0625
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


x^10
--------> L(n, f, x0) = 0.18782738583155176
--------> f(x0) = 0.0009765625
--------> leftSide = 0.18685082333155176
      n = 10, left side = 0.186850823331552,  1 / n^0.3000 = 0.501187233627272
      difference = 0.314336410295721


--------> L(n, f, x0) = 0.06681134142050742
--------> f(x0) = 0.0009765625
--------> leftSide = 0.06583477892050742
      n = 20, left side = 0.065834778920507,  1 / n^0.3000 = 0.407090531536904
      difference = 0.341255752616397


--------> L(n, f, x0) = 0.0058474132218746255
--------> f(x0) = 0.0009765625
--------> leftSide = 0.0048708507218746255
      n = 50, left side = 0.004870850721875,  1 / n^0.3000 = 0.309249494710992
      difference = 0.304378643989117
```

```
--------> L(n, f, x0) = 0.0020762699143100087
--------> f(x0) = 0.0009765625
--------> leftSide = 0.0010997074143100087
      n = 100, left side = 0.001099707414310,  1 / n^0.3000 = 0.251188643150958
      difference = 0.250088935736648


--------> L(n, f, x0) = 0.0013593673938147267
--------> f(x0) = 0.0009765625
--------> leftSide = 0.0003828048938147267
      n = 200, left side = 0.000382804893815,  1 / n^0.3000 = 0.204028577336837
      difference = 0.203645772443022


--------> L(n, f, x0) = 0.0011008394681483109
--------> f(x0) = 0.0009765625
--------> leftSide = 0.00012427696814831086
      n = 500, left side = 0.000124276968148,  1 / n^0.3000 = 0.154991898754834
      difference = 0.154867621786685


--------> L(n, f, x0) = 0.0010345676952653602
--------> f(x0) = 0.0009765625
--------> leftSide = 5.800519526536017E-05
      n = 1000, left side = 0.000058005195265,  1 / n^0.3000 = 0.125892541179417
      difference = 0.125834535984151


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0009765625
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0009765625
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0009765625
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
```

```
      difference = NaN


--------------------------------------------------------------------------------
x0 = 0.5, Power = 0.3 , lamda = 0.25 , q = 0.5
--------------------------------------------------------------------------------

x
--------> L(n, f, x0) = 0.5568097172543792
--------> f(x0) = 0.5
--------> leftSide = 0.05680971725437922
      n = 10, left side = 0.056809717254379,  1 / n^0.3000 = 0.501187233627272
      difference = 0.444377516372893


--------> L(n, f, x0) = 0.5632752819000139
--------> f(x0) = 0.5
--------> leftSide = 0.06327528190001386
      n = 20, left side = 0.063275281900014,  1 / n^0.3000 = 0.407090531536904
      difference = 0.343815249636891


--------> L(n, f, x0) = 0.5277227554082918
--------> f(x0) = 0.5
--------> leftSide = 0.027722755408291833
      n = 50, left side = 0.027722755408292,  1 / n^0.3000 = 0.309249494710992
      difference = 0.281526739302700


--------> L(n, f, x0) = 0.5138629435997856
--------> f(x0) = 0.5
--------> leftSide = 0.013862943599785571
      n = 100, left side = 0.013862943599786,  1 / n^0.3000 = 0.251188643150958
      difference = 0.237325699551172


--------> L(n, f, x0) = 0.5069314718055993
--------> f(x0) = 0.5
--------> leftSide = 0.006931471805599276
      n = 200, left side = 0.006931471805599,  1 / n^0.3000 = 0.204028577336837
      difference = 0.197097105531238


--------> L(n, f, x0) = 0.5027725887222398
--------> f(x0) = 0.5
--------> leftSide = 0.0027725887222398438
      n = 500, left side = 0.002772588722240,  1 / n^0.3000 = 0.154991898754834
      difference = 0.152219310032594
```

```
--------> L(n, f, x0) = 0.5013862943611196
--------> f(x0) = 0.5
--------> leftSide = 0.0013862943611195888
      n = 1000, left side = 0.001386294361120,  1 / n^0.3000 = 0.125892541179417
      difference = 0.124506246818297


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.5
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.5
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.5
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


x^2
--------> L(n, f, x0) = 0.39787275241087827
--------> f(x0) = 0.25
--------> leftSide = 0.14787275241087827
      n = 10, left side = 0.147872752410878,  1 / n^0.3000 = 0.501187233627272
      difference = 0.353314481216394


--------> L(n, f, x0) = 0.3478605569036921
--------> f(x0) = 0.25
--------> leftSide = 0.09786055690369211
      n = 20, left side = 0.097860556903692,  1 / n^0.3000 = 0.407090531536904
      difference = 0.309229974633212


--------> L(n, f, x0) = 0.2838868135786706
--------> f(x0) = 0.25
--------> leftSide = 0.03388681357867063
```

```
      n = 50, left side = 0.033886813578671,  1 / n^0.3000 = 0.309249494710992
      difference = 0.275362681132321


--------> L(n, f, x0) = 0.26540440538603105
--------> f(x0) = 0.25
--------> leftSide = 0.01540440538603105
      n = 100, left side = 0.015404405386031,  1 / n^0.3000 = 0.251188643150958
      difference = 0.235784237764927


--------> L(n, f, x0) = 0.25731683725369436
--------> f(x0) = 0.25
--------> leftSide = 0.007316837253694364
      n = 200, left side = 0.007316837253694,  1 / n^0.3000 = 0.204028577336837
      difference = 0.196711740083143


--------> L(n, f, x0) = 0.2528342471939351
--------> f(x0) = 0.25
--------> leftSide = 0.002834247193935102
      n = 500, left side = 0.002834247193935,  1 / n^0.3000 = 0.154991898754834
      difference = 0.152157651560899


--------> L(n, f, x0) = 0.2514017089790437
--------> f(x0) = 0.25
--------> leftSide = 0.001401708979043681
      n = 1000, left side = 0.001401708979044,  1 / n^0.3000 = 0.125892541179417
      difference = 0.124490832200373


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.25
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.25
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.25
```

```
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


x^3
--------> L(n, f, x0) = 0.29819200043142563
--------> f(x0) = 0.125
--------> leftSide = 0.17319200043142563
      n = 10, left side = 0.173192000431426,  1 / n^0.3000 = 0.501187233627272
      difference = 0.327995233195847


--------> L(n, f, x0) = 0.22886492552153206
--------> f(x0) = 0.125
--------> leftSide = 0.10386492552153206
      n = 20, left side = 0.103864925521532,  1 / n^0.3000 = 0.407090531536904
      difference = 0.303225606015372


--------> L(n, f, x0) = 0.15550737335115655
--------> f(x0) = 0.125
--------> leftSide = 0.030507373351156553
      n = 50, left side = 0.030507373351157,  1 / n^0.3000 = 0.309249494710992
      difference = 0.278742121359835


--------> L(n, f, x0) = 0.13776817957524634
--------> f(x0) = 0.125
--------> leftSide = 0.012768179575246341
      n = 100, left side = 0.012768179575246,  1 / n^0.3000 = 0.251188643150958
      difference = 0.238420463575712


--------> L(n, f, x0) = 0.1307839994262529
--------> f(x0) = 0.125
--------> leftSide = 0.005783999426252906
      n = 200, left side = 0.005783999426253,  1 / n^0.3000 = 0.204028577336837
      difference = 0.198244577910584


--------> L(n, f, x0) = 0.12717239948281703
--------> f(x0) = 0.125
--------> leftSide = 0.002172399482817028
      n = 500, left side = 0.002172399482817,  1 / n^0.3000 = 0.154991898754834
      difference = 0.152819499272017
```

```
--------> L(n, f, x0) = 0.12606290147692495
--------> f(x0) = 0.125
--------> leftSide = 0.001062901476924949
      n = 1000, left side = 0.001062901476925,  1 / n^0.3000 = 0.125892541179417
      difference = 0.124829639702492


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.125
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.125
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.125
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


x^4
--------> L(n, f, x0) = 0.24275735469621276
--------> f(x0) = 0.0625
--------> leftSide = 0.18025735469621276
      n = 10, left side = 0.180257354696213,  1 / n^0.3000 = 0.501187233627272
      difference = 0.320929878931060


--------> L(n, f, x0) = 0.15884980900644186
--------> f(x0) = 0.0625
--------> leftSide = 0.09634980900644186
      n = 20, left side = 0.096349809006442,  1 / n^0.3000 = 0.407090531536904
      difference = 0.310740722530463


--------> L(n, f, x0) = 0.0866914336230854
--------> f(x0) = 0.0625
--------> leftSide = 0.0241914336230854
      n = 50, left side = 0.024191433623085,  1 / n^0.3000 = 0.309249494710992
      difference = 0.285058061087906
```

```
--------> L(n, f, x0) = 0.07187035404303936
--------> f(x0) = 0.0625
--------> leftSide = 0.009370354043039361
      n = 100, left side = 0.009370354043039,  1 / n^0.3000 = 0.251188643150958
      difference = 0.241818289107919


--------> L(n, f, x0) = 0.06655904957310244
--------> f(x0) = 0.0625
--------> leftSide = 0.004059049573102436
      n = 200, left side = 0.004059049573102,  1 / n^0.3000 = 0.204028577336837
      difference = 0.199969527763735


--------> L(n, f, x0) = 0.06397973714572872
--------> f(x0) = 0.0625
--------> leftSide = 0.0014797371457287156
      n = 500, left side = 0.001479737145729,  1 / n^0.3000 = 0.154991898754834
      difference = 0.153512161609105


--------> L(n, f, x0) = 0.06321638757896159
--------> f(x0) = 0.0625
--------> leftSide = 0.0007163875789615859
      n = 1000, left side = 0.000716387578962,  1 / n^0.3000 = 0.125892541179417
      difference = 0.125176153600455


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0625
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0625
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0625
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
```

```
      difference = NaN


x^10
--------> L(n, f, x0) = 0.12023726345333331
--------> f(x0) = 0.0009765625
--------> leftSide = 0.11926070095333331
      n = 10, left side = 0.119260700953333,  1 / n^0.3000 = 0.501187233627272
      difference = 0.381926532673939


--------> L(n, f, x0) = 0.03832308332375248
--------> f(x0) = 0.0009765625
--------> leftSide = 0.03734652082375248
      n = 20, left side = 0.037346520823752,  1 / n^0.3000 = 0.407090531536904
      difference = 0.369744010713152


--------> L(n, f, x0) = 0.003778192061572009
--------> f(x0) = 0.0009765625
--------> leftSide = 0.002801629561572009
      n = 50, left side = 0.002801629561572,  1 / n^0.3000 = 0.309249494710992
      difference = 0.306447865149420


--------> L(n, f, x0) = 0.0016094677211458996
--------> f(x0) = 0.0009765625
--------> leftSide = 0.0006329052211458996
      n = 100, left side = 0.000632905221146,  1 / n^0.3000 = 0.251188643150958
      difference = 0.250555737929812


--------> L(n, f, x0) = 0.0011886064533363808
--------> f(x0) = 0.0009765625
--------> leftSide = 0.00021204395333638084
      n = 200, left side = 0.000212043953336,  1 / n^0.3000 = 0.204028577336837
      difference = 0.203816533383501


--------> L(n, f, x0) = 0.0010420433182459323
--------> f(x0) = 0.0009765625
--------> leftSide = 6.54808182459323E-05
      n = 500, left side = 0.000065480818246,  1 / n^0.3000 = 0.154991898754834
      difference = 0.154926417936588


--------> L(n, f, x0) = 0.00100640630978359
--------> f(x0) = 0.0009765625
```

```
--------> leftSide = 2.9843809783589893E-05
      n = 1000, left side = 0.000029843809784,  1 / n^0.3000 = 0.125892541179417
      difference = 0.125862697369633


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0009765625
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0009765625
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.0009765625
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN
```

Next, we use the cos and sin functions (we also changed the interval, and tried various values for x0). Here is the code:

[ ]:
```
using System;
using System.Diagnostics;

StreamWriter outFile = new StreamWriter("Results2.txt'');

double[] powers = { 3.0 / 10, 1.0 / 2, 7.0 / 10 };
double[] lamdas = { 1.0 / 4, 1.0 / 2, 1 };
double[] qs = { 1.0 / 4, 1.0 /2, 1 }; //deformation coefficient


//funcs = [x^(1/3), x] #choice of functions
List <Func < double, double > > funcs = new(); List funcNames = new();

funcNames.Add("sin(x)"); funcs.Add((x) => Math.Sin(x));
funcNames.Add("cos(x)"); funcs.Add((x) => Math.Cos(x));

double a = -Math.PI;// #the interval
double b = Math.PI; // #the interval
double[] x0s = { Math.PI / 4, Math.PI / 2, 3 * Math.PI / 4 };
```

```
foreach (var x0 in x0s) {
   foreach (var power in powers) {
      foreach (var lamda in lamdas) {
         foreach (var q in qs) {
            outFile.WriteLine(); outFile.WriteLine();
            outFile.
↪WriteLine("-------------------------------------------------------");
            outFile.WriteLine($"x0 = {x0}, Power = {power} , lamda = {lamda} , q␣
↪= {q}");
            outFile.
↪WriteLine("-------------------------------------------------------");

            //the activation function
            Func<double, double, double, double> phi = (lamda, q, x) =>
            {
                //  #formula  18.1
                return (Math.Pow(Math.E, (lamda * x)) - q * Math.Pow(Math.E,␣
↪(-lamda * x)))
                   / (Math.Pow(Math.E, (lamda * x)) + q * Math.Pow(Math.E,␣
↪(-lamda * x)));
            };


            Func<double, double, double, double> G = (lamda, q, x) =>
            {
                  //#formula 18.91
                return 1.0 / 4 * (phi(lamda, q, x + 1) - phi(lamda, q, x - 1));
            };


            int indexF = -1;
            //#############################################################
            foreach (var f in funcs)
            //#############################################################
            {

               indexF++;

               //show(f(x))
               outFile.WriteLine($"{funcNames[indexF]}");
               foreach (var n in new int[] { 10, 20, 50, 100, 200, 500, 1000,␣
↪2000, 5000, 10_000 })  //, 50_000, 100_000
               {
                   //#real-valued linear neural network operators
```

```
                    Func<double, Func<double, double>, double, double> L = (n, f,␣
↪x) =>
                    {
                         double totalNumer = 0;
                         double totalDenom = 0;
                         for (double k = Math.Ceiling(n * a); k <= Math.Floor(n *␣
↪b); k++)
                         {
                             totalNumer += f(k / n) * G(lamda, q, n * x - k);
                             totalDenom += G(lamda, q, n * x - k);
                         }
                         return totalNumer / totalDenom;
                    };
                    double computedL = L(n, f, x0);
                    double computedf = f(x0);

                    var leftSide = Math.Abs(computedL - computedf);
                    outFile.WriteLine($" --------> L(n, f, x0) = {computedL}");
                    outFile.WriteLine($" --------> f(x0) = {computedf}");
                    outFile.WriteLine($" --------> leftSide = {leftSide}");
                    var val1 = n;
                    var val2 = leftSide;
                    var val3 = 1 / (Math.Pow(n, power));
                    outFile.WriteLine($"          n = {val1}, left side = {val2:
↪F15},  1 / n ^ {power:F4} = {val3:F15}");
                    outFile.WriteLine($"          difference = {val3 - val2:F15}␣
↪");
                }
            }
          }
      }
   }
}
outFile.Close();
```

Here are some of the results obtained using the code above:

```
-------------------------------------------------------------------------------
x0 = 0.7853981633974483, Power = 0.3 , lamda = 0.25 , q = 0.25
-------------------------------------------------------------------------------


sin(x)

--------> L(n, f, x0) = 0.8173761586432317
--------> f(x0) = 0.7071067811865476
```

```
--------> leftSide = 0.11026937745668408
      n = 10, left side = 0.110269377456684,  1 / n^0.3000 = 0.501187233627272
      difference = 0.390917856170588


--------> L(n, f, x0) = 0.7847305388603272
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.0776237576737796
      n = 20, left side = 0.077623757673780,  1 / n^0.3000 = 0.407090531536904
      difference = 0.329466773863125


--------> L(n, f, x0) = 0.7432028965478586
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.036096115361311076
      n = 50, left side = 0.036096115361311,  1 / n^0.3000 = 0.309249494710992
      difference = 0.273153379349681


--------> L(n, f, x0) = 0.7259478084258294
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.018841027239281827
      n = 100, left side = 0.018841027239282,  1 / n^0.3000 = 0.251188643150958
      difference = 0.232347615911676


--------> L(n, f, x0) = 0.7167202150148566
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.009613433828309037
      n = 200, left side = 0.009613433828309,  1 / n^0.3000 = 0.204028577336837
      difference = 0.194415143508528


--------> L(n, f, x0) = 0.710997735413702
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.003890954227154464
      n = 500, left side = 0.003890954227154,  1 / n^0.3000 = 0.154991898754834
      difference = 0.151100944527679


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 1000, left side = NaN,  1 / n^0.3000 = 0.125892541179417
      difference = NaN


--------> L(n, f, x0) = NaN
```

```
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


cos(x)

--------> L(n, f, x0) = 0.45523737617970633
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.25186940500684124
      n = 10, left side = 0.251869405006841,  1 / n^0.3000 = 0.501187233627272
      difference = 0.249317828620431


--------> L(n, f, x0) = 0.5925643243319401
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.11454245685460751
      n = 20, left side = 0.114542456854608,  1 / n^0.3000 = 0.407090531536904
      difference = 0.292548074682297


--------> L(n, f, x0) = 0.6650335493966716
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.04207323178987599
      n = 50, left side = 0.042073231789876,  1 / n^0.3000 = 0.309249494710992
      difference = 0.267176262921116


--------> L(n, f, x0) = 0.6867689433198332
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.020337837866714392
      n = 100, left side = 0.020337837866714,  1 / n^0.3000 = 0.251188643150958
      difference = 0.230850805284244
```

```
--------> L(n, f, x0) = 0.6971189862142333
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.009987794972314279
      n = 200, left side = 0.009987794972314,  1 / n^0.3000 = 0.204028577336837
      difference = 0.194040782364523


--------> L(n, f, x0) = 0.7031559220730595
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.0039508591134880255
      n = 500, left side = 0.003950859113488,  1 / n^0.3000 = 0.154991898754834
      difference = 0.151041039641346


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 1000, left side = NaN,  1 / n^0.3000 = 0.125892541179417
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


--------------------------------------------------------------------------------
x0 = 0.7853981633974483, Power = 0.3 , lamda = 0.25 , q = 0.5
--------------------------------------------------------------------------------
```

```
sin(x)

--------> L(n, f, x0) = 0.7466168412004801
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.039510060013932535
      n = 10, left side = 0.039510060013933,  1 / n^0.3000 = 0.501187233627272
      difference = 0.461677173613340


--------> L(n, f, x0) = 0.7418056154262195
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.034698834239671905
      n = 20, left side = 0.034698834239672,  1 / n^0.3000 = 0.407090531536904
      difference = 0.372391697297233


--------> L(n, f, x0) = 0.7244809726831161
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.017374191496568492
      n = 50, left side = 0.017374191496568,  1 / n^0.3000 = 0.309249494710992
      difference = 0.291875303214423


--------> L(n, f, x0) = 0.7163577185903721
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.009250937403824544
      n = 100, left side = 0.009250937403825,  1 / n^0.3000 = 0.251188643150958
      difference = 0.241937705747133


--------> L(n, f, x0) = 0.7118709756592027
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.004764194472655081
      n = 200, left side = 0.004764194472655,  1 / n^0.3000 = 0.204028577336837
      difference = 0.199264382864182


--------> L(n, f, x0) = 0.7090454429256919
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.001938661739144365
      n = 500, left side = 0.001938661739144,  1 / n^0.3000 = 0.154991898754834
      difference = 0.153053237015689


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 1000, left side = NaN,  1 / n^0.3000 = 0.125892541179417
```

```
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN


cos(x)

--------> L(n, f, x0) = 0.5637961576061379
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.1433106235804097
      n = 10, left side = 0.143310623580410,  1 / n^0.3000 = 0.501187233627272
      difference = 0.357876610046863


--------> L(n, f, x0) = 0.6454912281086387
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.06161555307790889
      n = 20, left side = 0.061615553077909,  1 / n^0.3000 = 0.407090531536904
      difference = 0.345474978458996


--------> L(n, f, x0) = 0.6853812716148499
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.02172550957169772
      n = 50, left side = 0.021725509571698,  1 / n^0.3000 = 0.309249494710992
      difference = 0.287523985139294


--------> L(n, f, x0) = 0.6967664035262482
```

```
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.010340377660299382
      n = 100, left side = 0.010340377660299,  1 / n^0.3000 = 0.251188643150958
      difference = 0.240848265490659


--------> L(n, f, x0) = 0.7020701258174417
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.0050366553691059135
      n = 200, left side = 0.005036655369106,  1 / n^0.3000 = 0.204028577336837
      difference = 0.198991921967731


--------> L(n, f, x0) = 0.7051245211848308
--------> f(x0) = 0.7071067811865476
--------> leftSide = 0.0019822600017167513
      n = 500, left side = 0.001982260001717,  1 / n^0.3000 = 0.154991898754834
      difference = 0.153009638753117


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 1000, left side = NaN,  1 / n^0.3000 = 0.125892541179417
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 2000, left side = NaN,  1 / n^0.3000 = 0.102256518256357
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 5000, left side = NaN,  1 / n^0.3000 = 0.077679960971573
      difference = NaN


--------> L(n, f, x0) = NaN
--------> f(x0) = 0.7071067811865476
--------> leftSide = NaN
      n = 10000, left side = NaN,  1 / n^0.3000 = 0.063095734448019
      difference = NaN
```

15 Bivariate case approximation

15.1 Introduction

We present in here some of the background and the main result that was proven in the monograph [1], in Chapter 17, named "Banach Space Valued Multivariate Multi Layer Neural Network Approximation Based on q-Deformed and λ-Parametrized Hyperbolic Tangent Function".

The **activation function** [see monograph [1], formula 17.1] used for this part is defined as follows:

$$g_{q,\lambda}(x) := \frac{e^{\lambda x} - qe^{-\lambda x}}{e^{\lambda x} + qe^{-\lambda x}}, \forall\, x \in \mathbb{R}, where\ q,\ \lambda > 0. \tag{13}$$

Then [see [1], formulae 17.9 and 17.58], we present the **density function**:

$$M_{q,\lambda}(x) := \frac{1}{4}(g_{q,\lambda}(x+1) - q_{q,\lambda}(x-1)) > 0, \forall x \in \mathbb{R},\ where\ q,\ \lambda > 0, \tag{14}$$

and for the bivariate operator:

$$Z_{q,\lambda}(x_1, x_2) := M_{q,\lambda}(x_1) \cdot M_{q,\lambda}(x_2), \forall x = (x_1, x_2) \in \mathbb{R}^2,\ where\ q,\ \lambda > 0. \tag{15}$$

Lastly, (see [1], formula 17.69), we give the real-valued **bivariate linear normalized neural network operator**:

$$A_n(f, x_1, x_2) := \frac{\sum_{k1=\lceil na_1 \rceil}^{\lfloor nb_1 \rfloor} \sum_{k2=\lceil na_2 \rceil}^{\lfloor nb_2 \rfloor} f\left(\frac{k_1}{n}, \frac{k_2}{n}\right) (M_{q,\lambda}(nx_1 - k_1) \cdot M_{q,\lambda}(nx_2 - k_2))}{\left(\sum_{k1=\lceil na_1 \rceil}^{\lfloor nb_1 \rfloor} M_{q,\lambda}(nx_1 - k_1)\right) \cdot \left(\sum_{k2=\lceil na_2 \rceil}^{\lfloor nb_2 \rfloor} M_{q,\lambda}(nx_2 - k_2)\right)}, \tag{16}$$

$where\ f \in C([a_1, b_1] \times [a_2, b_2]),\ x_i \in [a_i, b_i],\ i = 1, 2,\ q,\ \lambda > 0.$

It was shown (see [1], Theorem 17.9), that:

$$\lim_{n \to \infty} A_n(f) = f, \tag{17}$$

pointwise and uniformly.

Next, we present our computational results using C#.

15.2 Using C#

[ ]:
```
using System;
using System.Diagnostics;


StreamWriter outFile = new StreamWriter("ResultsMultivariate.txt");

double[] powers = { 3.0 / 10 }; // { 3.0 / 10, 1.0 / 2, 7.0 / 10 };
double[] lamdas = { 1.0 / 4, 1.0 / 2, 1 };
double[] qs = { 1.0 / 4, 1.0 / 2 }; //deformation coefficient

//funcs = [x^(1/3), x]  #choice of functions
List<Func<double, double, double>> funcs = new();
List<string> funcNames = new();

funcNames.Add("sin(x*y)"); funcs.Add((x,y) => Math.Sin(x*y)); //for only a␣
 ↪single statement
funcNames.Add("cos(x+y)"); funcs.Add((x,y) => Math.Cos(x+y)); //for only a␣
 ↪single statement


double a = -Math.PI;//   #the interval
double b = Math.PI; //    #the interval
double[] x0s = { Math.PI / 4, Math.PI / 2, 3 * Math.PI / 4 };
double[] y0s = { Math.PI / 4, Math.PI / 2, 3 * Math.PI / 4 };

//the activation function
Func<double, double, double, double> phi = (lamda, q, x) =>
{
  return (Math.Pow(Math.E, (lamda * x)) - q * Math.Pow(Math.E, (-lamda * x)))
    / (Math.Pow(Math.E, (lamda * x)) + q * Math.Pow(Math.E, (-lamda * x))); // ␣
 ↪#formula  17.1
};


foreach (var x0 in x0s)
{
  foreach (var y0 in y0s)
  {
    foreach (var power in powers)
    {
      foreach (var lamda in lamdas)
      {
        foreach (var q in qs)
        {
```

```
        outFile.WriteLine();
        outFile.WriteLine();
        outFile.
↪WriteLine("-------------------------------------------------------");
        outFile.WriteLine($"x0 = {x0}, y0={y0}, Power = {power} , lamda =␣
↪{lamda} ,  q = {q}");
        outFile.
↪WriteLine("-------------------------------------------------------");




        Func<double, double, double, double> G = (lamda, q, x) =>
        {
          return 1.0 / 4 * (phi(lamda, q, x + 1) - phi(lamda, q, x - 1));  //
↪see formula 17.9
        };


        int indexF = -1;
        //#############################################################
        foreach (var f in funcs)
        //#############################################################
        {

          indexF++;

          //show(f(x))
          outFile.WriteLine($"{funcNames[indexF]}");
          foreach (var n in new int[] { 1, 5, 10, 100, 200, 500})   //see␣
↪formula 17.69
          {

              double totalNumer = 0;

              double sum1 = 0, sum2 = 0;
              for (double k1 = Math.Ceiling(n * a); k1 <= Math.Floor(n * b);␣
↪k1++)
              {
                for (double k2 = Math.Ceiling(n * a); k2 <= Math.Floor(n * b);␣
↪k2++)
                {
                  totalNumer += f(k1 / n, k2/n) * G(lamda, q, n * x0 - k1) *␣
↪G(lamda, q, n * y0 - k2);
                }
              }
```

```
                for (double k = Math.Ceiling(n * a); k <= Math.Floor(n * b); k++)
                {
                  sum1 += G(lamda, q, n * x0 - k);
                }

                for (double k = Math.Ceiling(n * a); k <= Math.Floor(n * b); k++)
                {
                  sum2 += G(lamda, q, n * y0 - k);
                }
              double computedL = totalNumer / (sum1*sum2);

              double computedf = f(x0,y0);

              var leftSide = Math.Abs(computedL - computedf);
              //outFile.WriteLine($" --------> L(n, f, x0, y0) = {computedL}");
              //outFile.WriteLine($" --------> f(x0,y0) = {computedf}");
              var val1 = n;
              var val3 = 1 / (Math.Pow(n, power));
              outFile.WriteLine($" --------> n = {val1}, leftSide = {leftSide},␣
 ↪difference = {val3 - leftSide:F15}");
            }

          }
        }
      }
    }
  }
}

outFile.Close();
```

```
-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=0.7853981633974483, Power=0.3, lamda=0.25,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5603358492312364, difference = 0.439664150768764
 --------> n = 5, leftSide = 0.1310742319590139, difference = 0.485959630760996
 --------> n = 10, leftSide = 0.18848685417437927, difference = 0.312700379452893
 --------> n = 100, leftSide = 0.03502349900488344, difference = 0.216165144146075
 --------> n = 200, leftSide = 0.017649853643137314, difference = 0.186378723693700
 --------> n = 500, leftSide = 0.00708818592339322, difference = 0.147903712831440
cos(x+y)
 --------> n = 1, leftSide = 0.0505057384628108, difference = 0.949494261537189
 --------> n = 5, leftSide = 0.5508946280390616, difference = 0.066139234680948
```

```
 --------> n = 10, leftSide = 0.46086271604738127, difference = 0.040324517579891
 --------> n = 100, leftSide = 0.05534863904962483, difference = 0.195840004101333
 --------> n = 200, leftSide = 0.02771298567058189, difference = 0.176315591666255
 --------> n = 500, leftSide = 0.011089529016998289, difference = 0.143902369737835


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=0.7853981633974483, Power=0.3, lamda=0.25,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.568511828999265, difference = 0.431488171000735
 --------> n = 5, leftSide = 0.1177810989519571, difference = 0.499252763768052
 --------> n = 10, leftSide = 0.08163830326496868, difference = 0.419548930362304
 --------> n = 100, leftSide = 0.01726327023878793, difference = 0.233925372912170
 --------> n = 200, leftSide = 0.008761299593207594, difference = 0.195267277743629
 --------> n = 500, leftSide = 0.0035337716671465236, difference = 0.
 ↪151458127087687
cos(x+y)
 --------> n = 1, leftSide = 0.03321770228863349, difference = 0.966782297711366
 --------> n = 5, leftSide = 0.31725762812120784, difference = 0.299776234598802
 --------> n = 10, leftSide = 0.23957060023273813, difference = 0.261616633394534
 --------> n = 100, leftSide = 0.027684959901099458, difference = 0.223503683249859
 --------> n = 200, leftSide = 0.013857824420667101, difference = 0.190170752916170
 --------> n = 500, leftSide = 0.005544849757553625, difference = 0.149447048997280


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=0.7853981633974483, Power=0.3, lamda=0.5,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5242063334974406, difference = 0.475793666502559
 --------> n = 5, leftSide = 0.17824399502907606, difference = 0.438789867690934
 --------> n = 10, leftSide = 0.15128511297820368, difference = 0.349902120649069
 --------> n = 100, leftSide = 0.017640319028731866, difference = 0.233548324122226
 --------> n = 200, leftSide = 0.008852350926071395, difference = 0.195176226410766
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.17105176049078444, difference = 0.828948239509216
 --------> n = 5, leftSide = 0.4562711432689492, difference = 0.160762719451060
 --------> n = 10, leftSide = 0.2640084241521494, difference = 0.237178809475123
 --------> n = 100, leftSide = 0.027712292550153908, difference = 0.223476350600804
 --------> n = 200, leftSide = 0.013861244054517835, difference = 0.190167333282319
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=0.7853981633974483, Power=0.3, lamda=0.5,  q=0.5
-------------------------------------------------------------------------------
```

```
sin(x*y)
 --------> n = 1, leftSide = 0.5271829720826484, difference = 0.472817027917352
 --------> n = 5, leftSide = 0.0741568440105349, difference = 0.542877018709475
 --------> n = 10, leftSide = 0.0703249708411523, difference = 0.430862262786120
 --------> n = 100, leftSide = 0.008752069678607088, difference = 0.242436573472351
 --------> n = 200, leftSide = 0.004408969337715174, difference = 0.199619607999122
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.12406518105940369, difference = 0.875934818940596
 --------> n = 5, leftSide = 0.23717964442617406, difference = 0.379854218293836
 --------> n = 10, leftSide = 0.13328288047686793, difference = 0.367904353150404
 --------> n = 100, leftSide = 0.013857478646570491, difference = 0.237331164504388
 --------> n = 200, leftSide = 0.0069307881539852284, difference = 0.
 ↪197097789182852
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=0.7853981633974483, Power=0.3, lamda=1,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.3766446931098869, difference = 0.623355306890113
 --------> n = 5, leftSide = 0.14433319051535165, difference = 0.472700672204658
 --------> n = 10, leftSide = 0.08306812279488662, difference = 0.418119110832386
 --------> n = 100, leftSide = 0.008847268931951424, difference = 0.242341374219007
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.3654430015411151, difference = 0.634556998458885
 --------> n = 5, leftSide = 0.2612978659627136, difference = 0.355735996757296
 --------> n = 10, leftSide = 0.13658111312006863, difference = 0.364606120507204
 --------> n = 100, leftSide = 0.013867359594955293, difference = 0.237321283556003
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=0.7853981633974483, Power=0.3, lamda=1,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.37546113193021197, difference = 0.624538868069788
 --------> n = 5, leftSide = 0.06500801161307324, difference = 0.552025851106936
 --------> n = 10, leftSide = 0.0395742976828517, difference = 0.461612935944421
 --------> n = 100, leftSide = 0.004397141443465813, difference = 0.246791501707492
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.22408470026778576, difference = 0.775915299732214
```

```
 --------> n = 5, leftSide = 0.132085066395304, difference = 0.484948796324706
 --------> n = 10, leftSide = 0.06852554674473353, difference = 0.432661686882539
 --------> n = 100, leftSide = 0.0069263586404547444, difference = 0.
 ↪244262284510503
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=0.7853981633974483, y0=1.5707963267948966, Power=0.3, lamda=0.25,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9239545552925531, difference = 0.076045444707447
 --------> n = 5, leftSide = 0.7407181930290099, difference = -0.123684330309000
 --------> n = 10, leftSide = 0.24846261949434578, difference = 0.252724614132927
 --------> n = 100, leftSide = 0.017695212963459328, difference = 0.233493430187499
 --------> n = 200, leftSide = 0.009848946875683828, difference = 0.194179630461153
 --------> n = 500, leftSide = 0.004170939343787428, difference = 0.150820959411046
cos(x+y)
 --------> n = 1, leftSide = 0.6563123309488232, difference = 0.343687669051177
 --------> n = 5, leftSide = 0.06595275106552934, difference = 0.551081111654480
 --------> n = 10, leftSide = 0.14585722146238667, difference = 0.355330012164886
 --------> n = 100, leftSide = 0.037098680879204315, difference = 0.214089962271754
 --------> n = 200, leftSide = 0.019085890398383487, difference = 0.184942686938453
 --------> n = 500, leftSide = 0.00775983612541431, difference = 0.147232062629419


--------------------------------------------------------------------------------
x0=0.7853981633974483, y0=1.5707963267948966, Power=0.3, lamda=0.25,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9315564478407371, difference = 0.068443552159263
 --------> n = 5, leftSide = 0.5556726989987174, difference = 0.061361163721292
 --------> n = 10, leftSide = 0.164787654867126, difference = 0.336399578760146
 --------> n = 100, leftSide = 0.008329407978986403, difference = 0.242859235171972
 --------> n = 200, leftSide = 0.004791944719788499, difference = 0.199236632617048
 --------> n = 500, leftSide = 0.0020639803683792923, difference = 0.
 ↪152927918386454
cos(x+y)
 --------> n = 1, leftSide = 0.6674215419953312, difference = 0.332578458004669
 --------> n = 5, leftSide = 0.09746599838599257, difference = 0.519567864334017
 --------> n = 10, leftSide = 0.057866594908942526, difference = 0.443320638718330
 --------> n = 100, leftSide = 0.01835150152180387, difference = 0.232837141629154
 --------> n = 200, leftSide = 0.009492565812904474, difference = 0.194536011523932
 --------> n = 500, leftSide = 0.003871767875614718, difference = 0.151120130879219
```

```
--------------------------------------------------------------------------------
x0=0.7853981633974483, y0=1.5707963267948966, Power=0.3, lamda=0.5,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.8966568724411209, difference = 0.103343127558879
 --------> n = 5, leftSide = 0.26243205180466256, difference = 0.354601810915347
 --------> n = 10, leftSide = 0.009896258492545718, difference = 0.491290975134727
 --------> n = 100, leftSide = 0.009811385946394746, difference = 0.241377257204563
 --------> n = 200, leftSide = 0.005156820776599402, difference = 0.198871756560238
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.5507682666492701, difference = 0.449231733350730
 --------> n = 5, leftSide = 0.13765334679964802, difference = 0.479380515920362
 --------> n = 10, leftSide = 0.1355469185117204, difference = 0.365640315115552
 --------> n = 100, leftSide = 0.019067735679156983, difference = 0.232120907471801
 --------> n = 200, leftSide = 0.009669394152941657, difference = 0.194359183183895
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=0.7853981633974483, y0=1.5707963267948966, Power=0.3, lamda=0.5,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.8909282712186807, difference = 0.109071728781319
 --------> n = 5, leftSide = 0.1794802023467934, difference = 0.437553660373216
 --------> n = 10, leftSide = 0.01759699920183666, difference = 0.483590234425436
 --------> n = 100, leftSide = 0.004754973527030915, difference = 0.246433669623927
 --------> n = 200, leftSide = 0.002540359332032449, difference = 0.201488218004805
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.5438131333830379, difference = 0.456186866616962
 --------> n = 5, leftSide = 0.05032774694127595, difference = 0.566706115778734
 --------> n = 10, leftSide = 0.06261350361998574, difference = 0.438573730007287
 --------> n = 100, leftSide = 0.009474650977698063, difference = 0.241713992173260
 --------> n = 200, leftSide = 0.004819775968564310 5, difference = 0.
 ↪199208801368273
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=0.7853981633974483, y0=1.5707963267948966, Power=0.3, lamda=1,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.821907473372728, difference = 0.178092526627272
 --------> n = 5, leftSide = 0.027646303919920734, difference = 0.589387558800089
 --------> n = 10, leftSide = 0.022689484951259886, difference = 0.478497748676012
 --------> n = 100, leftSide = 0.005120633165550226, difference = 0.246068009985408
 --------> n = 200, leftSide = NaN, difference = NaN
```

```
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.324991077838988, difference = 0.675008922161012
 --------> n = 5, leftSide = 0.127146841158018, difference = 0.489887021561992
 --------> n = 10, leftSide = 0.08177513454609897, difference = 0.419412099081173
 --------> n = 100, leftSide = 0.00965147597778071, difference = 0.241537167173177
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=0.7853981633974483, y0=1.5707963267948966, Power=0.3, lamda=1,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.7673300548315893, difference = 0.232669945168411
 --------> n = 5, leftSide = 0.03381145165229105, difference = 0.583222411067719
 --------> n = 10, leftSide = 0.006051113924451013, difference = 0.495136119702821
 --------> n = 100, leftSide = 0.0025029048556297617, difference = 0.
 ↪248685738295328
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.3285634867991426, difference = 0.671436513200857
 --------> n = 5, leftSide = 0.05501692071740949, difference = 0.562016942002600
 --------> n = 10, leftSide = 0.03863376377363903, difference = 0.462553469853633
 --------> n = 100, leftSide = 0.004801509423281836, difference = 0.246387133727676
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=0.7853981633974483, y0=2.356194490192345, Power=0.3, lamda=0.25,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9402161080978435, difference = 0.059783891902156
 --------> n = 5, leftSide = 0.9498934678762577, difference = -0.332859605156248
 --------> n = 10, leftSide = 0.7017348119261979, difference = -0.200547578298926
 --------> n = 100, leftSide = 0.031922814262192345, difference = 0.219265828888766
 --------> n = 200, leftSide = 0.013993822680222756, difference = 0.190034754656614
 --------> n = 500, leftSide = 0.0051248395052390094, difference = 0.
 ↪149867059249595
cos(x+y)
 --------> n = 1, leftSide = 0.9503357585315514, difference = 0.049664241468449
 --------> n = 5, leftSide = 0.4537739831199443, difference = 0.163259879600065
 --------> n = 10, leftSide = 0.2184911945049388, difference = 0.282696039122334
 --------> n = 100, leftSide = 0.0028831814041029302, difference = 0.
 ↪248305461746855
```

```
 --------> n = 200, leftSide = 0.0007214606192176287, difference = 0.
 ↪203307116717619
 --------> n = 500, leftSide = 0.00011546352666280679, difference = 0.
 ↪154876435228171


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=2.356194490192345, Power=0.3, lamda=0.25,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9474589716636656, difference = 0.052541028336334
 --------> n = 5, leftSide = 0.7602911061398281, difference = -0.143257243419818
 --------> n = 10, leftSide = 0.4540208519979142, difference = 0.047166381629358
 --------> n = 100, leftSide = 0.016984461765722658, difference = 0.234204181385235
 --------> n = 200, leftSide = 0.007254166382035354, difference = 0.196774410954802
 --------> n = 500, leftSide = 0.0026037301881448593, difference = 0.
 ↪152388168566689
cos(x+y)
 --------> n = 1, leftSide = 0.9563509123366939, difference = 0.043649087663306
 --------> n = 5, leftSide = 0.34562263752865396, difference = 0.271411225191356
 --------> n = 10, leftSide = 0.14037856419010586, difference = 0.360808669437166
 --------> n = 100, leftSide = 0.001732017559051724, difference = 0.249456625591906
 --------> n = 200, leftSide = 0.00043330910632766173, difference = 0.
 ↪203595268230509
 --------> n = 500, leftSide = 6.934311749240418E-05, difference = 0.
 ↪154922555637341


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=2.356194490192345, Power=0.3, lamda=0.5,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9202607864783152, difference = 0.079739213521685
 --------> n = 5, leftSide = 0.6974652378150932, difference = -0.080431375095084
 --------> n = 10, leftSide = 0.3046267525099131, difference = 0.196560481117359
 --------> n = 100, leftSide = 0.014067884449064816, difference = 0.237120758701893
 --------> n = 200, leftSide = 0.006523008571408639, difference = 0.197505568765428
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.8688161767510898, difference = 0.131183823248910
 --------> n = 5, leftSide = 0.2155924409832557, difference = 0.401441421736754
 --------> n = 10, leftSide = 0.07161943645948254, difference = 0.429567797167790
 --------> n = 100, leftSide = 0.0007464423906479167, difference = 0.
 ↪250442200760310
 --------> n = 200, leftSide = 0.0001866556200013081, difference = 0.
 ↪203841921716836
 --------> n = 500, leftSide = NaN, difference = NaN
```

```
-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=2.356194490192345, Power=0.3, lamda=0.5,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9153890310526238, difference = 0.084610968947376
 --------> n = 5, leftSide = 0.46321818652950186, difference = 0.153815676190508
 --------> n = 10, leftSide = 0.18103979384090818, difference = 0.320147439786364
 --------> n = 100, leftSide = 0.007328233712312393, difference = 0.243860409438646
 --------> n = 200, leftSide = 0.0033352748130388576, difference = 0.
 ↪200693302523798
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.8225483073255397, difference = 0.177451692674460
 --------> n = 5, leftSide = 0.14378240587447833, difference = 0.473251456845531
 --------> n = 10, leftSide = 0.044409431173700664, difference = 0.456777802453572
 --------> n = 100, leftSide = 0.0004582980713653262, difference = 0.
 ↪250730345079593
 --------> n = 200, leftSide = 0.00011459564480531537, difference = 0.
 ↪203913981692032
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=2.356194490192345, Power=0.3, lamda=1,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9105735246046178, difference = 0.089426475395382
 --------> n = 5, leftSide = 0.32557317589075074, difference = 0.291460686829259
 --------> n = 10, leftSide = 0.1173377621393622, difference = 0.383849471487910
 --------> n = 100, leftSide = 0.006600127404657874, difference = 0.244588515746300
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.6790890976440375, difference = 0.320910902355963
 --------> n = 5, leftSide = 0.08005712680315735, difference = 0.536976735916852
 --------> n = 10, leftSide = 0.020967288708739873, difference = 0.480219944918532
 --------> n = 100, leftSide = 0.0002117230559122163, difference = 0.
 ↪250976920095046
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=0.7853981633974483, y0=2.356194490192345, Power=0.3, lamda=1,  q=0.5
-------------------------------------------------------------------------------
```

```
sin(x*y)
 --------> n = 1, leftSide = 0.8635798426028963, difference = 0.136420157397104
 --------> n = 5, leftSide = 0.20577724025342536, difference = 0.411256622466584
 --------> n = 10, leftSide = 0.06958999856682024, difference = 0.431597235060452
 --------> n = 100, leftSide = 0.003408025614788701, difference = 0.247780617536169
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.5852072744273846, difference = 0.414792725572615
 --------> n = 5, leftSide = 0.05360161831086174, difference = 0.563432244409148
 --------> n = 10, leftSide = 0.013866203183831916, difference = 0.487321030443440
 --------> n = 100, leftSide = 0.00013966152120425956, difference = 0.
 ↪251048981629754
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=0.7853981633974483, Power=0.3, lamda=0.25,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9239545552925531, difference = 0.076045444707447
 --------> n = 5, leftSide = 0.7407181930290097, difference = -0.123684330309000
 --------> n = 10, leftSide = 0.24846261949434556, difference = 0.252724614132927
 --------> n = 100, leftSide = 0.01769521296345733, difference = 0.233493430187501
 --------> n = 200, leftSide = 0.009848946875685494, difference = 0.194179630461151
 --------> n = 500, leftSide = 0.0041709393437773246, difference = 0.
 ↪150820959411056
cos(x+y)
 --------> n = 1, leftSide = 0.6563123309488232, difference = 0.343687669051177
 --------> n = 5, leftSide = 0.06595275106552956, difference = 0.551081111654480
 --------> n = 10, leftSide = 0.14585722146238522, difference = 0.355330012164887
 --------> n = 100, leftSide = 0.03709868087920154, difference = 0.214089962271756
 --------> n = 200, leftSide = 0.019085890398382377, difference = 0.184942686938455
 --------> n = 500, leftSide = 0.007759836125418973, difference = 0.147232062629415


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=0.7853981633974483, Power=0.3, lamda=0.25,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9315564478407371, difference = 0.068443552159263
 --------> n = 5, leftSide = 0.5556726989987166, difference = 0.061361163721293
 --------> n = 10, leftSide = 0.1647876548671281, difference = 0.336399578760144
 --------> n = 100, leftSide = 0.008329407978986292, difference = 0.242859235171972
 --------> n = 200, leftSide = 0.004791944719790608, difference = 0.199236632617046
 --------> n = 500, leftSide = 0.0020639803683659697, difference = 0.
 ↪152927918386468
```

```
cos(x+y)
 --------> n = 1, leftSide = 0.6674215419953312, difference = 0.332578458004669
 --------> n = 5, leftSide = 0.09746599838599246, difference = 0.519567864334017
 --------> n = 10, leftSide = 0.057866594908943525, difference = 0.443320638718329
 --------> n = 100, leftSide = 0.018351501521805202, difference = 0.232837141629153
 --------> n = 200, leftSide = 0.009492565812902365, difference = 0.194536011523935
 --------> n = 500, leftSide = 0.00387176787562149, difference = 0.151120130879212


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=0.7853981633974483, Power=0.3, lamda=0.5,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.8966568724411209, difference = 0.103343127558879
 --------> n = 5, leftSide = 0.26243205180466256, difference = 0.354601810915347
 --------> n = 10, leftSide = 0.00989625849254605, difference = 0.491290975134726
 --------> n = 100, leftSide = 0.00981138594639508, difference = 0.241377257204563
 --------> n = 200, leftSide = 0.005156820776599402, difference = 0.198871756560238
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.5507682666492703, difference = 0.449231733350730
 --------> n = 5, leftSide = 0.1376533467996477, difference = 0.479380515920362
 --------> n = 10, leftSide = 0.13554691851172052, difference = 0.365640315115552
 --------> n = 100, leftSide = 0.01906773567915976, difference = 0.232120907471798
 --------> n = 200, leftSide = 0.009669394152939992, difference = 0.194359183183897
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=0.7853981633974483, Power=0.3, lamda=0.5,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.8909282712186807, difference = 0.109071728781319
 --------> n = 5, leftSide = 0.1794802023467934, difference = 0.437553660373216
 --------> n = 10, leftSide = 0.01759699920183999, difference = 0.483590234425432
 --------> n = 100, leftSide = 0.00475497352702936, difference = 0.246433669623929
 --------> n = 200, leftSide = 0.002540359332030895, difference = 0.201488218004806
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.5438131333830378, difference = 0.456186866616962
 --------> n = 5, leftSide = 0.050327746941276064, difference = 0.566706115778734
 --------> n = 10, leftSide = 0.06261350361998619, difference = 0.438573730007286
 --------> n = 100, leftSide = 0.009474650977699284, difference = 0.241713992173259
 --------> n = 200, leftSide = 0.004819775968562312, difference = 0.199208801368275
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
```

```
x0=1.5707963267948966, y0=0.7853981633974483, Power=0.3, lamda=1,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.8219074733727281, difference = 0.178092526627272
 --------> n = 5, leftSide = 0.0276463039199214, difference = 0.589387558800088
 --------> n = 10, leftSide = 0.02268948495125933, difference = 0.478497748676013
 --------> n = 100, leftSide = 0.005120633165548227, difference = 0.246068009985410
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.324991077838988, difference = 0.675008922161012
 --------> n = 5, leftSide = 0.127146841158017, difference = 0.489887021561993
 --------> n = 10, leftSide = 0.0817751345460983, difference = 0.419412099081174
 --------> n = 100, leftSide = 0.009651475977781154, difference = 0.241537167173177
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=1.5707963267948966, y0=0.7853981633974483, Power=0.3, lamda=1,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.7673300548315893, difference = 0.232669945168411
 --------> n = 5, leftSide = 0.03381145165229105, difference = 0.583222411067719
 --------> n = 10, leftSide = 0.006051113924450902, difference = 0.495136119702821
 --------> n = 100, leftSide = 0.0025029048556293176, difference = 0.
 ↪248685738295329
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.32856348679914266, difference = 0.671436513200857
 --------> n = 5, leftSide = 0.05501692071740927, difference = 0.562016942002600
 --------> n = 10, leftSide = 0.03863376377363836, difference = 0.462553469853634
 --------> n = 100, leftSide = 0.004801509423281947, difference = 0.246387133727676
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=1.5707963267948966, y0=1.5707963267948966, Power=0.3, lamda=0.25,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.6026147996589162, difference = 0.397385200341084
 --------> n = 5, leftSide = 0.7576994505433036, difference = -0.140665587823294
 --------> n = 10, leftSide = 0.7660185735493232, difference = -0.264831339922051
 --------> n = 100, leftSide = 0.07286744970092618, difference = 0.178321193450032
 --------> n = 200, leftSide = 0.03525843845438681, difference = 0.168770138882450
 --------> n = 500, leftSide = 0.013809505442841541, difference = 0.141182393311992
```

```
cos(x+y)
 --------> n = 1, leftSide = 0.9504584513751807, difference = 0.049541548624819
 --------> n = 5, leftSide = 0.577491592200249, difference = 0.039542270519761
 --------> n = 10, leftSide = 0.2522910132797712, difference = 0.248896220347501
 --------> n = 100, leftSide = 0.0028831814041004877, difference = 0.
 ↪248305461746858
 --------> n = 200, leftSide = 0.0007214606192106343, difference = 0.
 ↪203307116717626
 --------> n = 500, leftSide = 0.00011546352664959514, difference = 0.
 ↪154876435228184


--------------------------------------------------------------------------------
x0=1.5707963267948966, y0=1.5707963267948966, Power=0.3, lamda=0.25,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.6093663308625931, difference = 0.390633669137407
 --------> n = 5, leftSide = 0.5610247774776371, difference = 0.056009085242372
 --------> n = 10, leftSide = 0.4450144239704958, difference = 0.056172809656777
 --------> n = 100, leftSide = 0.03674976150498799, difference = 0.214438881645970
 --------> n = 200, leftSide = 0.017705689943415703, difference = 0.186322887393421
 --------> n = 500, leftSide = 0.006916768653180472, difference = 0.148075130101653
cos(x+y)
 --------> n = 1, leftSide = 0.9540246654362885, difference = 0.045975334563712
 --------> n = 5, leftSide = 0.4064304049969918, difference = 0.210603457723018
 --------> n = 10, leftSide = 0.15639670379129256, difference = 0.344790529835980
 --------> n = 100, leftSide = 0.0017320175590486153, difference = 0.
 ↪249456625591909
 --------> n = 200, leftSide = 0.0004333091063186689, difference = 0.
 ↪203595268230518
 --------> n = 500, leftSide = 6.9343117476528E-05, difference = 0.154922555637357


--------------------------------------------------------------------------------
x0=1.5707963267948966, y0=1.5707963267948966, Power=0.3, lamda=0.5,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5822952705583352, difference = 0.417704729441665
 --------> n = 5, leftSide = 0.7559909175736127, difference = -0.138957054853603
 --------> n = 10, leftSide = 0.42510422525089975, difference = 0.076083008376373
 --------> n = 100, leftSide = 0.03529538460827253, difference = 0.215893258542685
 --------> n = 200, leftSide = 0.01733324606478437, difference = 0.186695331272053
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.8927358523754148, difference = 0.107264147624585
 --------> n = 5, leftSide = 0.2584237378720501, difference = 0.358610124847960
 --------> n = 10, leftSide = 0.07231497281905863, difference = 0.428872260808214
```

```
 --------> n = 100, leftSide = 0.0007464423578245061, difference = 0.
 ↪250442200793134
 --------> n = 200, leftSide = 0.00018665561921904494, difference = 0.
 ↪203841921717618
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=1.5707963267948966, Power=0.3, lamda=0.5,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5712591065614122, difference = 0.428740893438588
 --------> n = 5, leftSide = 0.44508273517328206, difference = 0.171951127546728
 --------> n = 10, leftSide = 0.22546562367032164, difference = 0.275721609956951
 --------> n = 100, leftSide = 0.01774340568001498, difference = 0.233445237470943
 --------> n = 200, leftSide = 0.008690265698572675, difference = 0.195338311638264
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.8306217533788608, difference = 0.169378246621139
 --------> n = 5, leftSide = 0.1641617584594547, difference = 0.452872104260555
 --------> n = 10, leftSide = 0.04473340484449506, difference = 0.456453828782777
 --------> n = 100, leftSide = 0.0004582980591308905, difference = 0.
 ↪250730345091827
 --------> n = 200, leftSide = 0.0001145956449623009, difference = 0.
 ↪203913981691875
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=1.5707963267948966, Power=0.3, lamda=1,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5864627875423122, difference = 0.413537212457688
 --------> n = 5, leftSide = 0.4287981920363517, difference = 0.188235670683658
 --------> n = 10, leftSide = 0.20093969529286165, difference = 0.300247538334411
 --------> n = 100, leftSide = 0.017362961147294076, difference = 0.233825682003664
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.7775838073968335, difference = 0.222416192603166
 --------> n = 5, leftSide = 0.08151153166798486, difference = 0.535522331052025
 --------> n = 10, leftSide = 0.020966437843750962, difference = 0.480220795783521
 --------> n = 100, leftSide = 0.00021157613089495264, difference = 0.
 ↪250977067020063
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
```

```
--------------------------------------------------------------------------------
x0=1.5707963267948966, y0=1.5707963267948966, Power=0.3, lamda=1,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5057556442116913, difference = 0.494244355788309
 --------> n = 5, leftSide = 0.2346664067784031, difference = 0.382367455941606
 --------> n = 10, leftSide = 0.10506887541473142, difference = 0.396118358212541
 --------> n = 100, leftSide = 0.008731863296700282, difference = 0.242456779854258
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.6436935676998752, difference = 0.356306432300125
 --------> n = 5, leftSide = 0.05428305599937022, difference = 0.562750806720639
 --------> n = 10, leftSide = 0.013870693229541708, difference = 0.487316540397731
 --------> n = 100, leftSide = 0.00013952141038031662, difference = 0.
 ↪251049121740578
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=1.5707963267948966, y0=2.356194490192345, Power=0.3, lamda=0.25,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5537842093586645, difference = 0.446215790641336
 --------> n = 5, leftSide = 0.37551401483085034, difference = 0.241519847889159
 --------> n = 10, leftSide = 0.02663661968240949, difference = 0.474550613944863
 --------> n = 100, leftSide = 0.08611285934143897, difference = 0.165075783809519
 --------> n = 200, leftSide = 0.04469670818492533, difference = 0.159331869151912
 --------> n = 500, leftSide = 0.01823431892300409, difference = 0.136757579831830
cos(x+y)
 --------> n = 1, leftSide = 0.660152586826157, difference = 0.339847413173843
 --------> n = 5, leftSide = 0.5670364770160042, difference = 0.049997385704005
 --------> n = 10, leftSide = 0.4557508128202348, difference = 0.045436420807038
 --------> n = 100, leftSide = 0.04117611512366948, difference = 0.210012528027289
 --------> n = 200, leftSide = 0.020106189790788487, difference = 0.183922387546048
 --------> n = 500, leftSide = 0.0079231262107613, difference = 0.147068772544072


--------------------------------------------------------------------------------
x0=1.5707963267948966, y0=2.356194490192345, Power=0.3, lamda=0.25,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.547569451503161, difference = 0.452430548496839
 --------> n = 5, leftSide = 0.38034214102619746, difference = 0.236691721693812
 --------> n = 10, leftSide = 0.032163269965970465, difference = 0.469023963661302
 --------> n = 100, leftSide = 0.04233088568827148, difference = 0.208857757462687
```

```
 --------> n = 200, leftSide = 0.022156076723690243, difference = 0.181872500613147
 --------> n = 500, leftSide = 0.009085359449139019, difference = 0.145906539305695
cos(x+y)
 --------> n = 1, leftSide = 0.6579976470662093, difference = 0.342002352933791
 --------> n = 5, leftSide = 0.3377738443426027, difference = 0.279260018377407
 --------> n = 10, leftSide = 0.2513911570566785, difference = 0.249796076570594
 --------> n = 100, leftSide = 0.02080094424408141, difference = 0.230387698906877
 --------> n = 200, leftSide = 0.010105357427786177, difference = 0.193923219909051
 --------> n = 500, leftSide = 0.003969833852825011, difference = 0.151022064902009


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=2.356194490192345, Power=0.3, lamda=0.5,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5704248425429528, difference = 0.429575157457047
 --------> n = 5, leftSide = 0.009919594222051353, difference = 0.607114268497958
 --------> n = 10, leftSide = 0.23303120616958128, difference = 0.268156027457691
 --------> n = 100, leftSide = 0.04463818187578661, difference = 0.206550461275171
 --------> n = 200, leftSide = 0.022707338656893006, difference = 0.181321238679944
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.6517138357795285, difference = 0.348286164220472
 --------> n = 5, leftSide = 0.4417370424804969, difference = 0.175296820239513
 --------> n = 10, leftSide = 0.23666474907473672, difference = 0.264522484552536
 --------> n = 100, leftSide = 0.02012336472332099, difference = 0.231065278427637
 --------> n = 200, leftSide = 0.00993336495227648, difference = 0.194095212384560
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=2.356194490192345, Power=0.3, lamda=0.5,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5764461054459599, difference = 0.423553894554040
 --------> n = 5, leftSide = 0.05496840388241481, difference = 0.562065458837595
 --------> n = 10, leftSide = 0.10301135506292736, difference = 0.398175878564345
 --------> n = 100, leftSide = 0.022100217951421697, difference = 0.229088425199536
 --------> n = 200, leftSide = 0.011297600056453083, difference = 0.192730977280384
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.5588128792203702, difference = 0.441187120779630
 --------> n = 5, leftSide = 0.2459443806488938, difference = 0.371089482071116
 --------> n = 10, leftSide = 0.12526363870721335, difference = 0.375923594920059
 --------> n = 100, leftSide = 0.010122782300449829, difference = 0.241065860850508
 --------> n = 200, leftSide = 0.004981838752162626, difference = 0.199046738584674
 --------> n = 500, leftSide = NaN, difference = NaN
```

```
-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=2.356194490192345, Power=0.3, lamda=1,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5271717580108257, difference = 0.472828241989174
 --------> n = 5, leftSide = 0.19770756255080557, difference = 0.419326300169204
 --------> n = 10, leftSide = 0.17545000849985937, difference = 0.325737225127413
 --------> n = 100, leftSide = 0.022649081258080628, difference = 0.228539561892877
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.666766673600017, difference = 0.333233326399983
 --------> n = 5, leftSide = 0.23998424116413997, difference = 0.377049621555870
 --------> n = 10, leftSide = 0.11145546263263473, difference = 0.389731770994638
 --------> n = 100, leftSide = 0.009950631514490715, difference = 0.241238011636467
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=1.5707963267948966, y0=2.356194490192345, Power=0.3, lamda=1,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5653606011950689, difference = 0.434639398804931
 --------> n = 5, leftSide = 0.07432229274307256, difference = 0.542711569976937
 --------> n = 10, leftSide = 0.08060332438948326, difference = 0.420583909237789
 --------> n = 100, leftSide = 0.01124510674757051, difference = 0.239943536403388
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.4778374955528845, difference = 0.522162504447115
 --------> n = 5, leftSide = 0.13044635524604042, difference = 0.486587507473969
 --------> n = 10, leftSide = 0.058211923670450805, difference = 0.442975309956822
 --------> n = 100, leftSide = 0.004999939310337598, difference = 0.246188703840620
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=0.7853981633974483, Power=0.3, lamda=0.25,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9402161080978435, difference = 0.059783891902156
 --------> n = 5, leftSide = 0.9498934678762575, difference = -0.332859605156248
 --------> n = 10, leftSide = 0.7017348119261975, difference = -0.200547578298925
 --------> n = 100, leftSide = 0.03192281426219079, difference = 0.219265828888767
 --------> n = 200, leftSide = 0.01399382268021876, difference = 0.190034754656618
```

```
 --------> n = 500, leftSide = 0.005124839505234791, difference = 0.149867059249599
cos(x+y)
 --------> n = 1, leftSide = 0.9503357585315514, difference = 0.049664241468449
 --------> n = 5, leftSide = 0.45377398311994455, difference = 0.163259879600065
 --------> n = 10, leftSide = 0.21849119450493704, difference = 0.282696039122335
 --------> n = 100, leftSide = 0.0028831814040992665, difference = 0.
 ↪248305461746859
 --------> n = 200, leftSide = 0.0007214606192108564, difference = 0.
 ↪203307116717626
 --------> n = 500, leftSide = 0.00011546352665803283, difference = 0.
 ↪154876435228176


--------------------------------------------------------------------------------
x0=2.356194490192345, y0=0.7853981633974483, Power=0.3, lamda=0.25,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9474589716636656, difference = 0.052541028336334
 --------> n = 5, leftSide = 0.7602911061398283, difference = -0.143257243419819
 --------> n = 10, leftSide = 0.45402085199791353, difference = 0.047166381629359
 --------> n = 100, leftSide = 0.016984461765722547, difference = 0.234204181385235
 --------> n = 200, leftSide = 0.007254166382030469, difference = 0.196774410954806
 --------> n = 500, leftSide = 0.002603730188143638, difference = 0.152388168566690
cos(x+y)
 --------> n = 1, leftSide = 0.9563509123366939, difference = 0.043649087663306
 --------> n = 5, leftSide = 0.3456226375286541, difference = 0.271411225191356
 --------> n = 10, leftSide = 0.14037856419010464, difference = 0.360808669437168
 --------> n = 100, leftSide = 0.0017320175590491704, difference = 0.
 ↪249456625591909
 --------> n = 200, leftSide = 0.00043330910632521924, difference = 0.
 ↪203595268230512
 --------> n = 500, leftSide = 6.934311748874045E-05, difference = 0.
 ↪154922555637345


--------------------------------------------------------------------------------
x0=2.356194490192345, y0=0.7853981633974483, Power=0.3, lamda=0.5,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9202607864783152, difference = 0.079739213521685
 --------> n = 5, leftSide = 0.6974652378150936, difference = -0.080431375095084
 --------> n = 10, leftSide = 0.3046267525099131, difference = 0.196560481117359
 --------> n = 100, leftSide = 0.0140678844490697, difference = 0.237120758701888
 --------> n = 200, leftSide = 0.0065230085714090835, difference = 0.
 ↪197505568765428
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
```

```
 --------> n = 1, leftSide = 0.8688161767510898, difference = 0.131183823248910
 --------> n = 5, leftSide = 0.21559244098325714, difference = 0.401441421736752
 --------> n = 10, leftSide = 0.07161943645948099, difference = 0.429567797167791
 --------> n = 100, leftSide = 0.0007464423906504702, difference = 0.
 ↪250442200760308
 --------> n = 200, leftSide = 0.0001866556200018632, difference = 0.
 ↪203841921716835
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=2.356194490192345, y0=0.7853981633974483, Power=0.3, lamda=0.5,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9153890310526239, difference = 0.084610968947376
 --------> n = 5, leftSide = 0.46321818652950136, difference = 0.153815676190508
 --------> n = 10, leftSide = 0.1810397938409093, difference = 0.320147439786363
 --------> n = 100, leftSide = 0.007328233712313947, difference = 0.243860409438644
 --------> n = 200, leftSide = 0.0033352748130385246, difference = 0.
 ↪200693302523798
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.8225483073255397, difference = 0.177451692674460
 --------> n = 5, leftSide = 0.143782405874478, difference = 0.473251456845532
 --------> n = 10, leftSide = 0.04440943117370211, difference = 0.456677802453570
 --------> n = 100, leftSide = 0.0004582980713698781, difference = 0.
 ↪250730345079588
 --------> n = 200, leftSide = 0.0001145956448059815, difference = 0.
 ↪203913981692031
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=2.356194490192345, y0=0.7853981633974483, Power=0.3, lamda=1,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.9105735246046179, difference = 0.089426475395382
 --------> n = 5, leftSide = 0.3255731758907503, difference = 0.291460686829259
 --------> n = 10, leftSide = 0.11733776213936231, difference = 0.383849471487910
 --------> n = 100, leftSide = 0.006600127404657652, difference = 0.244588515746300
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.6790890976440376, difference = 0.320910902355962
 --------> n = 5, leftSide = 0.08005712680315691, difference = 0.536976735916853
 --------> n = 10, leftSide = 0.020967288708740317, difference = 0.480219944918532
```

```
 --------> n = 100, leftSide = 0.0002117230559112171, difference = 0.
 ↪250976920095047
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=0.7853981633974483, Power=0.3, lamda=1,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.8635798426028964, difference = 0.136420157397104
 --------> n = 5, leftSide = 0.20577724025342514, difference = 0.411256622466584
 --------> n = 10, leftSide = 0.06958999856682002, difference = 0.431597235060452
 --------> n = 100, leftSide = 0.00340802561478748, difference = 0.247780617536171
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.5852072744273848, difference = 0.414792725572615
 --------> n = 5, leftSide = 0.053601618310860966, difference = 0.563432244409149
 --------> n = 10, leftSide = 0.01386620318383236, difference = 0.487321030443440
 --------> n = 100, leftSide = 0.00013966152120381548, difference = 0.
 ↪251048981629754
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=1.5707963267948966, Power=0.3, lamda=0.25,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5537842093586645, difference = 0.446215790641336
 --------> n = 5, leftSide = 0.37551401483085045, difference = 0.241519847889159
 --------> n = 10, leftSide = 0.026636619682409157, difference = 0.474550613944863
 --------> n = 100, leftSide = 0.08611285934143931, difference = 0.165075783809519
 --------> n = 200, leftSide = 0.04469670818492821, difference = 0.159331869151909
 --------> n = 500, leftSide = 0.01823431892300642, difference = 0.136757579831827
cos(x+y)
 --------> n = 1, leftSide = 0.6601525868261571, difference = 0.339847413173843
 --------> n = 5, leftSide = 0.5670364770160046, difference = 0.049997385704005
 --------> n = 10, leftSide = 0.4557508128202357, difference = 0.045436420807037
 --------> n = 100, leftSide = 0.04117611512366748, difference = 0.210012528027291
 --------> n = 200, leftSide = 0.02010618979078682, difference = 0.183922387546050
 --------> n = 500, leftSide = 0.00792312621075797, difference = 0.147068772544076


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=1.5707963267948966, Power=0.3, lamda=0.25,  q=0.5
```

```
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.547569451503161, difference = 0.452430548496839
 --------> n = 5, leftSide = 0.38034214102619746, difference = 0.236691721693812
 --------> n = 10, leftSide = 0.03216326996597102, difference = 0.469023963661301
 --------> n = 100, leftSide = 0.04233088568827226, difference = 0.208857757462686
 --------> n = 200, leftSide = 0.02215607672369424, difference = 0.181872500613143
 --------> n = 500, leftSide = 0.009085359449142238, difference = 0.145906539305691
cos(x+y)
 --------> n = 1, leftSide = 0.6579976470662093, difference = 0.342002352933791
 --------> n = 5, leftSide = 0.33777384434260255, difference = 0.279260018377407
 --------> n = 10, leftSide = 0.2513911570566783, difference = 0.249796076570594
 --------> n = 100, leftSide = 0.020800944244082742, difference = 0.230387698906875
 --------> n = 200, leftSide = 0.01010535742778329, difference = 0.193923219909054
 --------> n = 500, leftSide = 0.0039698338528224575, difference = 0.
 ↪151022064902011


--------------------------------------------------------------------------------
x0=2.356194490192345, y0=1.5707963267948966, Power=0.3, lamda=0.5,  q=0.25
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5704248425429528, difference = 0.429575157457047
 --------> n = 5, leftSide = 0.009919594222051464, difference = 0.607114268497958
 --------> n = 10, leftSide = 0.23303120616958273, difference = 0.268156027457690
 --------> n = 100, leftSide = 0.044638181875786276, difference = 0.206550461275172
 --------> n = 200, leftSide = 0.022707338656893117, difference = 0.181321238679944
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.6517138357795285, difference = 0.348286164220472
 --------> n = 5, leftSide = 0.4417370424804969, difference = 0.175296820239513
 --------> n = 10, leftSide = 0.23666474907473656, difference = 0.264522484552536
 --------> n = 100, leftSide = 0.020123364723321324, difference = 0.231065278427637
 --------> n = 200, leftSide = 0.00993336495227759, difference = 0.194095212384559
 --------> n = 500, leftSide = NaN, difference = NaN


--------------------------------------------------------------------------------
x0=2.356194490192345, y0=1.5707963267948966, Power=0.3, lamda=0.5,  q=0.5
--------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5764461054459599, difference = 0.423553894554040
 --------> n = 5, leftSide = 0.05496840388241503, difference = 0.562065458837595
 --------> n = 10, leftSide = 0.10301135506292924, difference = 0.398175878564343
 --------> n = 100, leftSide = 0.022100217951421697, difference = 0.229088425199536
 --------> n = 200, leftSide = 0.011297600056453527, difference = 0.192730977280383
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
```

```
 --------> n = 1, leftSide = 0.5588128792203702, difference = 0.441187120779630
 --------> n = 5, leftSide = 0.2459443806488943, difference = 0.371089482071115
 --------> n = 10, leftSide = 0.1252636387072129, difference = 0.375923594920059
 --------> n = 100, leftSide = 0.01012278230045116, difference = 0.241065860850507
 --------> n = 200, leftSide = 0.004981838752162848, difference = 0.199046738584674
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=1.5707963267948966, Power=0.3, lamda=1,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5271717580108257, difference = 0.472828241989174
 --------> n = 5, leftSide = 0.1977075625508048, difference = 0.419326300169205
 --------> n = 10, leftSide = 0.17545000849986037, difference = 0.325737225127412
 --------> n = 100, leftSide = 0.02264908125807985, difference = 0.228539561892878
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.666766673600017, difference = 0.333233326399983
 --------> n = 5, leftSide = 0.23998424116413997, difference = 0.377049621555870
 --------> n = 10, leftSide = 0.11145546263263517, difference = 0.389731770994637
 --------> n = 100, leftSide = 0.009950631514490937, difference = 0.241238011636467
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=1.5707963267948966, Power=0.3, lamda=1,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.5653606011950689, difference = 0.434639398804931
 --------> n = 5, leftSide = 0.07432229274307223, difference = 0.542711569976937
 --------> n = 10, leftSide = 0.08060332438948326, difference = 0.420583909237789
 --------> n = 100, leftSide = 0.0112451067475704, difference = 0.239943536403388
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.4778374955528847, difference = 0.522162504447115
 --------> n = 5, leftSide = 0.13044635524603976, difference = 0.486587507473970
 --------> n = 10, leftSide = 0.05821192367045103, difference = 0.442975309956821
 --------> n = 100, leftSide = 0.00499993931033893, difference = 0.246188703840619
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=2.356194490192345, Power=0.3, lamda=0.25,  q=0.25
```

```
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.6925871453474989, difference = 0.307412854652501
 --------> n = 5, leftSide = 0.7584957733336617, difference = -0.141461910613652
 --------> n = 10, leftSide = 0.8789857151594607, difference = -0.377798481532188
 --------> n = 100, leftSide = 0.10758145989687384, difference = 0.143607183254084
 --------> n = 200, leftSide = 0.05132398144856276, difference = 0.152704595888274
 --------> n = 500, leftSide = 0.019889821206692027, difference = 0.135102077548142
cos(x+y)
 --------> n = 1, leftSide = 0.04302847225921516, difference = 0.956971527740785
 --------> n = 5, leftSide = 0.21735958970458044, difference = 0.399674273015429
 --------> n = 10, leftSide = 0.39345934112815295, difference = 0.107727892499119
 --------> n = 100, leftSide = 0.055348639049624435, difference = 0.195840004101334
 --------> n = 200, leftSide = 0.02771298567058151, difference = 0.176315591666255
 --------> n = 500, leftSide = 0.011089529016998372, difference = 0.143902369737835


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=2.356194490192345, Power=0.3, lamda=0.25,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.687036222663277, difference = 0.312963777336723
 --------> n = 5, leftSide = 0.5934355620160883, difference = 0.023598300703921
 --------> n = 10, leftSide = 0.5624694469096623, difference = -0.061282213282390
 --------> n = 100, leftSide = 0.05480942320370796, difference = 0.196379219947250
 --------> n = 200, leftSide = 0.025905610387507827, difference = 0.178122966949329
 --------> n = 500, leftSide = 0.009982890207115513, difference = 0.145009008547718
cos(x+y)
 --------> n = 1, leftSide = 0.050930004607481885, difference = 0.949069995392518
 --------> n = 5, leftSide = 0.015100386386186132, difference = 0.601933476333823
 --------> n = 10, leftSide = 0.1926149215227114, difference = 0.308572312104561
 --------> n = 100, leftSide = 0.02768495990109943, difference = 0.223503683249859
 --------> n = 200, leftSide = 0.013857824420666817, difference = 0.190170752916170
 --------> n = 500, leftSide = 0.005544849757553584, difference = 0.149447048997280


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=2.356194490192345, Power=0.3, lamda=0.5,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.7103775500517433, difference = 0.289622449948257
 --------> n = 5, leftSide = 0.8400996538212805, difference = -0.223065791101271
 --------> n = 10, leftSide = 0.6119861519617393, difference = -0.110798918334467
 --------> n = 100, leftSide = 0.051410506737241124, difference = 0.199778136413717
 --------> n = 200, leftSide = 0.025020872041063735, difference = 0.179007705295773
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.01619033567029482, difference = 0.983809664329705
```

```
 --------> n = 5, leftSide = 0.36436684098431893, difference = 0.252667021735691
 --------> n = 10, leftSide = 0.26214283494469137, difference = 0.239044398682581
 --------> n = 100, leftSide = 0.027712292875384497, difference = 0.223476350275574
 --------> n = 200, leftSide = 0.013861243745072993, difference = 0.190167333591764
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=2.356194490192345, Power=0.3, lamda=0.5,  q=0.5
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.7090579463642067, difference = 0.290942053635793
 --------> n = 5, leftSide = 0.5425020384013203, difference = 0.074531824318689
 --------> n = 10, leftSide = 0.3450579219536573, difference = 0.156129311673615
 --------> n = 100, leftSide = 0.02599518205331708, difference = 0.225193461097641
 --------> n = 200, leftSide = 0.012581620450654696, difference = 0.191446956886182
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.09418888355280962, difference = 0.905811116447190
 --------> n = 5, leftSide = 0.1732451421806875, difference = 0.443788720539322
 --------> n = 10, leftSide = 0.13219821581911256, difference = 0.368989017808160
 --------> n = 100, leftSide = 0.013857478599215869, difference = 0.237331164551742
 --------> n = 200, leftSide = 0.006930788347494963, difference = 0.197097788989342
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=2.356194490192345, Power=0.3, lamda=1,  q=0.25
-------------------------------------------------------------------------------
sin(x*y)
 --------> n = 1, leftSide = 0.6698891250551241, difference = 0.330110874944876
 --------> n = 5, leftSide = 0.6082720715946032, difference = 0.008761791125406
 --------> n = 10, leftSide = 0.30354265011280357, difference = 0.197644583514469
 --------> n = 100, leftSide = 0.025121339875409543, difference = 0.226067303275548
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.2101981690253152, difference = 0.789801830974685
 --------> n = 5, leftSide = 0.25730768810921967, difference = 0.359726174610790
 --------> n = 10, leftSide = 0.13666230437207122, difference = 0.364524929255201
 --------> n = 100, leftSide = 0.01386690093644301, difference = 0.237321742214515
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN


-------------------------------------------------------------------------------
x0=2.356194490192345, y0=2.356194490192345, Power=0.3, lamda=1,  q=0.5
-------------------------------------------------------------------------------
```

```
sin(x*y)
 --------> n = 1, leftSide = 0.6542084126179514, difference = 0.345791587382049
 --------> n = 5, leftSide = 0.3584336915320941, difference = 0.258600171187916
 --------> n = 10, leftSide = 0.16452563031225964, difference = 0.336661603315013
 --------> n = 100, leftSide = 0.012670741987398593, difference = 0.238517901163559
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
cos(x+y)
 --------> n = 1, leftSide = 0.017085590495459647, difference = 0.982914409504540
 --------> n = 5, leftSide = 0.12966081548961508, difference = 0.487373047230395
 --------> n = 10, leftSide = 0.06842715102822401, difference = 0.432760082599048
 --------> n = 100, leftSide = 0.0069292372673999654, difference = 0.
 ↪244259405883558
 --------> n = 200, leftSide = NaN, difference = NaN
 --------> n = 500, leftSide = NaN, difference = NaN
```

15.3 Using SageMath

For completeness, we give below (without numbers) SageMath code that can be used for the Bivariate case approximation.

[ ]:
```
var('x y')  #declare x and y as variables
RR.scientific_notation(True)
powers = [3/10, 1/2, 7/10]
lamdas = [1/4, 1/2, 1]   #deformation parameter lamda over (0, 1] - these are␣
 ↪the beta values in the formula
qs = [1/4, 1/2]  #deformation coefficient

funcs = [sin(x*y), cos((x+y)/2)]  #choice of functions
a = -pi   #the interval
b = pi    #the interval
x0s= [pi/4, pi/2, 3*pi/4]
y0s= [pi/4, pi/2, 3*pi/4]

##########################################################
for x0 in x0s:
##########################################################
    for y0 in y0s:
    ########################################################
        for power in powers:      #going over various powers for 1/n^power
            ########################################################
            for lamda in lamdas:  #going over each lamda value
            ########################################################
                for q in qs:      #going over each q value
                ##########################################################
                    #the activation function
```

```
                    phi(x) =  (e^(lamda*x)-q*e^(-lamda*x))/
↪(e^(lamda*x)+q*e^(-lamda*x))   #formula  17.1
                    G(x) = 1/4*(phi(x+1) - phi(x-1))    #formula 17.9
                    #MultiG(x, y) = G(x)*G(y)            #formula 17.58
                    print()
                    print()
                   ␣
↪print("-------------------------------------------------------------------------------")
                    print("(x0, y0) = (" + str(x0) +", " + str(y0)+ "),  Power =␣
↪"+ str(power)+ ", lamda = "+ str(lamda) + ",  q = " + str(q))
                   ␣
↪print("-------------------------------------------------------------------------------")


                    ##########################################################
                    for i in range(len(funcs)):
                    ##########################################################
                        f(x,y)=funcs[i]
                        show(f(x,y))
                        for n in [1, 4, 16, 128]:
                            #below it uses formula 17.69
                            #numerator = sum( sum( f(k1/n,k2/
↪n)*(G(n*x-k1)*G(n*y-k2)) for k2 in [ceil(n*a),..,floor(n*b)]) for k1  in␣
↪[ceil(n*a),..,floor(n*b)])
                            #denominator = (sum(G(n*x-k1) for k1 in [ceil(n*a),..
↪,floor(n*b)]))*(sum(G(n*y-k2) for k2 in [ceil(n*a),..,floor(n*b)]))
                            #L(x,y) = numerator/denominator
                            numerator = sum( sum( f(k1/n,k2/
↪n)*(G(n*x0-k1)*G(n*y0-k2)) for k2 in [ceil(n*a),..,floor(n*b)]) for k1  in␣
↪[ceil(n*a),..,floor(n*b)]).n()
                            denominator = (sum(G(n*x0-k1) for k1 in [ceil(n*a),..
↪,floor(n*b)]))*(sum(G(n*y0-k2) for k2 in [ceil(n*a),..,floor(n*b)])).n()
                            #L = numerator/denominator

                            leftSide  = abs(numerator/denominator - f(x0,y0)).n()
                            val3 = 1/(n^power).n()

                            print("          n = "+str(n), ",   left side  =␣
↪"+str(leftSide),
                                  "\n                    \t 1/n^("+str(power)+")␣
↪= "+str(val3), "\t difference = "+str(val3-leftSide))
```

16 Conclusion

Here we give numerical applications for the approximation by the parametrized, deformed activation function neural networks. The parametrized activation function kills much fewer neurons than the original one. The asymmetry of the brain is best expressed by deformed activation functions. So in this monograph we present extensive numerical applications of neural networks approximation, as they are presented for the first time in the recent monograph by the first author, titled "Parametrized, Deformed and General Neural networks", Springer, Heidelberg, New York, 2023. That is confirming with numbers the theoretical results of this monograph.

References

[1] George A. Anastassiou (2023) *Parametrized, Deformed and General Neural Networks*, Springer, Heidelberg, New York.

[2] George A. Anastassiou, Razvan A. Mezei (2015) *Numerical Analysis Using Sage*, Springer, Heidelberg, New York.

[3] The Sage Developers (2023) *the Sage Mathematics Software System (Version 9.5)* , https://www.sagemath.org.

[4] StatisticalHelp (2023) *Precision*, https://www.statsdirect.com/help/basics/precision.htm.

This work is meant to be a companion to the published monograph of G.A. Anastassiou [Parametrized, Deformed and General Neural Networks, Springer, Heidelberg, New York, 2023], where the theoretical foundations for these results have already been established. In particular, in there, it was proven that the various operators presented below converge quantitatively to the identity operator.

In this current work would like to give our readers a sense of the error of approximation for various operators and particular values of n, parameter λ, deformation coefficient q, activation functions, density functions, neural network operators, and intervals applied for various functions. We estimate the error of approximation f the various neural network operators, and also compare the results to various monomial polynomial functions.

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